ARCHIVES OF OPHTHALMOLOGY.

# A NEW AND CONVENIENT TEST FOR COLOR BLINDNESS.

By Dr. RICHARD HILBERT, of Königsberg.

Translated by Dr. Cornelius Williams, St. Paul, Minn.

THE methods of examination for color-blindness may be arranged in three principal groups: 1st. The pseudo-isochromatic test. 2d. The test by contrast. 3d. The selection test.

Stilling's plates,[1] Daae's plate,[2] Keersmäcker's stripes,[3] Cohn's worsted letters,[4] Donder's silk skeins,[5] the small colored plates of V. Reuss,[6] and Mauthner's pseudo-isochromatic powder test,[7] all belong to the pseudo-isochromatic tests. The well-known experiment with colored shadows,[8] the tissue-paper experiment of Mayer after Weber,[9] the Pflüger plates,[10] the mirror-reflex experiment of Ragona Scina,[11] and the Brücke experiment,[12] are contrast tests; while the method of Seebeck [13] (colored paper), Holmgren,[14] Thompson,[15] Schenkl [16] (worsteds), Magnus [17] (small plates), Cohn [18] (pigments), Badal,[19] and the color triangle of Lips,[20] belong to the selection tests. As belonging to none of these three groups, since they may be applied with any of them, there are besides the spectral apparatus,[21] the polariscope, Rose,[22] the colored top,[23] the Hierlinger plates,[24] the colored-glass test,[25] Raddi's international color-scale,[26] Parinaud's chromoptometer,[27] Keersmäcker's apparatus,[28] and the fluorescent-body test.[29] Finally, there are yet to be mentioned, as belonging to the auxiliary methods for the more accurate examination of the color-blind, the numerical apparatus for determining color-perception of Ad. Weber,[30]

and the plates for ascertaining the acuity of vision for colors of Dor,[31] Snellen,[32] Stilling,[33] and Ole Bull.[34]

It might be well supposed that with such an *embaras de richesse* as to methods of examination, a new one would be superfluous, but with so many-sided a subject as that of color-blindness, and in consideration of the fact that one so often has to deal with cases of simulation, any method which is simple in its theory and easy in its application becomes of value. Such a method is herewith offered.

This method may probably be of use in the recognition of weakened or weak color-perception. I say probably, for, in absence of any such cases, I am without experience in this respect.

The material which I have employed in the examination of the color-blind is changeable silk. It is extensively used, and may be obtained of any dealer in silk. The particular kind of this silk which we find most useful is the red and green changeable, in which sap-green and purple threads cross at right angles. This makes a glossy surface, which, according to the direction of the folds, appears in some places red and in others green, while, as the position of the piece is changed, there is a constant interchange and play of these two colors.

My conjecture that the red-green blind would not be able to properly name and place the colors of this silk was completely confirmed, even the color-blind who were expert in sorting colors being unable to do so. And, further, I think this method will prove to be convenient in the examination of large numbers as to color-sense, especially as it can be employed with artificial light. It is self-evident that the result in the case of those who have preceded shall not be known to those who come after in the examination.

The author has examined a number of color-blind persons by this method, and the result of the examination of a few intelligent ones is submitted. Their statements may be relied upon as truthful and accurate. The greater number of these gentlemen had been carefully examined before, and the result of their examination published.[35]

Case 1.—Mr. Franz S., barrister, Königsberg, calls the silk brown, varying from light to dark brown.

Case 2.—Arthur S., upper-class student, Königsberg, calls the silk gray-brown, and says it appears gray or brown according to the way in which the light strikes it.

Case 3.—Mr. Carl S., apothecary, Königsberg, calls the silk blue and green, and is very firm in this opinion.

Case 4.—Mr. O., student of mathematics, Königsberg, declares the silk to be red and blue.

Case 5.—Mr. M., student of mathematics, Königsberg, can only recognize gray—at most, perhaps, light and dark shades of gray in the silk.

Case 6.—Mr. Albert N., merchant, Königsberg, is only able to recognize brown.

Case 7.—Mr. Ernest F., of Elbing, suffers from pathological color-blindness from genuine atrophy n. optici. (The exact conditions have been already published.[29]) Declares the silk to be light gray.

It is seen that the designation of colors on the part of the several color-blind persons is very varying; but none of them name the right color. In the majority of cases the silk appears gray or brown to the color-blind. In cases 3 and 4 purple was called blue, and in 3 green was called green, and in 4 taken for red.

The cases here given are selected from a great number as typical ones. Nos. 2, 3, 4, and 5 are men educated in natural science; all are intelligent, and are aware of their defect. I therefore claim that, from my experience, this test is not only convenient, but is certain; at all events, it appears to me to be the one which, for a preliminary examination of a large number, will consume the least time. I introduced case 7 only to demonstrate that pathological color-blindness does not differ from that which is congenital in its manifestations.

Changeable silk may be made so as to show blue and yellow, as well as red and green, and may be used to detect blue-yellow blindness as well. I have not had a case of this variety lately, and am therefore unable to furnish any data respecting it. The rarity of this form of color-blindness, however, would render the use of the blue-yellow test almost unnecessary.

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# A CASE OF SUDDEN AMAUROSIS FOLLOWED BY HOMONYMOUS SUPERIOR HEMIANOPIA.

By THEODORE WIETHE, M.D.,

LATE SENIOR ASSISTANT SURGEON TO THE OPHTHALMIC CLINIQUE OF PROF. VON JAEGER, IN VIENNA, AUSTRIA.

Translated by Dr. A. SCHAPRINGER, New York.

THE literature of altitudinal—*i. e.*, superior or inferior—hemianopia is very meagre. The writings of Mackenzie and Von Graefe contain only cursory allusions to this subject. The first case published in full was that of Mauthner (1872):

There was loss of consciousness and headache for three days, followed by a defect in the upper part of the field of vision in both eyes. This defect increased in the course of two years, and at the end of this time involved almost the entire upper outer quadrant of each side. The defects were bounded by a zigzag line running above the horizontal meridian but quite near to it. The defect was somewhat larger on the right side than on the left, the vertical boundary line of the former nearly reaching the vertical meridian. In the course of time vision was gradually restored, but the patient became subject to epileptic attacks and died suddenly.

A similar case of homonymous superior hemianopia was observed by Schoen. In 1873, Russell published a case of monocular superior hemianopia of the right eye followed by complete blindness of both; and, in 1876, Schweigger, one of homonymous superior hemianopia with diminished perception of light in the upper part of the field of vision.

In all of these cases no changes could be seen with the aid of the ophthalmoscope. Other cases have been published, such as two by Knapp, and one each by Schoen and by Schweigger, in which the retina or the optic nerve was diseased, and which, therefore, were not properly cases of hemianopia.

This short list includes all the cases of altitudinal hemianopia which have hitherto been observed clinically. *Post-mortem* examinations were made in two instances only, viz.: in the case of Mauthner, where the result was negative, and in the one of Russell, who found a tumor at the base of the brain.

The following is a sketch of a case of homonymous superior hemianopia which I have observed during life. The description of the lesions found after death has been transcribed from the record-book of autopsies, and will be found very defective and unsatisfactory. That it is so, is due to the fact that the autopsy was performed without a knowledge of the peculiar and interesting clinical features of the case.

A laborer, fifty-four years old, was admitted to the ophthalmic wards of Professor Von Jaeger on June 27, 1881, on account of sudden loss of vision which had occurred on the previous day. His eyesight had never been very good, but his general health had always been excellent up to two years ago when he had an attack of acute articular rheumatism which was followed by shortness of breath. He denied ever having had syphilis, nor could any traces of it be found upon examination.

In the early part of the month of February, 1881, he accidentally fell from a ladder the distance of about ten feet, striking the ground with his occiput. He became unconscious, and remained so for several hours, bleeding from the mouth, nose, and ears. On coming to he complained of violent headache; there was neither vomiting nor paralysis. His recovery was both protracted and incomplete, for since that time he has felt a constant "pressure upon his brain," his memory and will-power have become impaired, and he has suffered from frequent attacks of headache. About Easter-time he had a stroke of apoplexy with left-sided hemiplegia, but was able to work again by the end of a few weeks.

On the day preceding his admission he was busy raking hay, when his eyesight suddenly became impaired. It grew worse for the next hour and a half, at the end of which time it was totally abolished.

*Status præsens.*—Patient tall, well nourished, of a large frame. The skull was markedly dolichocephalous. Head erect. Irides blue. Pupils equally and widely dilated, not responding to light. Eyeballs immovable, visual lines nearly parallel and slightly elevated. Media clear. Lids widely separated. Ophthalmoscope shows compound hyperopic astigmatism in both eyes, requiring for its correction about + $\frac{1}{12}$ in the vertical, and + $\frac{1}{8}$ in the horizontal meridian. Fundus otherwise normal—*i. e.*, no disease of either the retina or the optic nerve. Paresis of the left facial nerve, involving the twigs supplying the lips, nostrils, and eyelids. Deviation of tongue to the right. The sense of taste impaired upon the left side of the tongue. Sense of smell, as tested with spirits of turpentine, wanting. He answers questions correctly ; his hearing power appears to be normal. The sensibility of the skin is nowhere diminished. The pressure of his hands is strong and equal on both sides. There is no unsteadiness in walking. Area of dulness over heart increased, heart-sounds louder than normal. Pulse 60, strong, jerking, and incompressible. Temperature normal. Intense headache.

Ordered : ice-cap to head, and iodide of potassium internally.

*June 28th.*—Headache unabated. Had been vomiting several times during the night.

*June 29th.*—Headache somewhat less. Patient says that he had been seeing a mist before his eyes since last evening. In the course of the afternoon he said that he could discern objects. A slight difference could now be noticed in the size of the pupils, the left not being quite so much dilated as the right. The left pupil reacted whenever light was thrown either into the left eye, or into the right, whilst the right pupil continued immovable. He counted fingers at fifteen feet with the left eye, and at twelve feet with the right.

*July 1st.*—Pupils equally and moderately dilated, each reacting well upon direct stimulus as well as in sympathy with the other. Headache gone.

His vision was again tested a few days afterward when he was found able to count fingers at the distance of eighteen feet with either eye. His color-perception was unimpaired. The upper

half of the visual field of both eyes was wanting. Subsequent examinations made with the aid of a perimeter showed that the boundary line of the defect in the right eye coincided with the horizontal meridian, whilst in the left eye it ran at a distance of eight or twelve degrees above it. In the latter eye a narrow zone of amblyopia appeared to exist between the lower preserved portion of the visual field and the upper portion in which vision was entirely abolished. In this zone a lighted candle could be perceived by the patient, but not a piece of white paper.

Binocular vision was preserved, as proved by the fact that he could always tell whether the convex or the concave side of a pair of curved scissors was presented to him. He never saw double. He could freely move both eyes downward as well as to the right or left, but not upward.

Subsequent repeated examinations elicited no change from the condition just described. After staying at the clinique for three months, he was transferred to the poorhouse.

The *diagnosis* made was: *Hemorrhage at the base of the brain in the neighborhood of the optic chiasm.* This diagnosis was based on the sudden onset of the amaurosis and the complete immobility of the pupils. These two symptoms might also have been produced by bilateral lesions of the optic tracts, the optic thalami, the geniculate bodies, the corona radiata, or the occipital lobes, but such locations were highly improbable, since one could not reasonably suppose that two distinct lesions, one in each hemisphere, should have occurred exactly at one and the same time. The corpora quadrigemina had to be excluded since there were no disturbances of coördination such as are said to occur invariably with lesions of this organ. The possibility of embolism instead of hemorrhage had also to be taken into consideration, but there were no circumstances in its favor, whilst the occurrence of hemorrhage was made plausible by the atheromatous condition of the arteries. Besides this, the traumatism occasioned by the fall from the ladder was also likely to have produced changes within the skull cavity predisposing to rupture of the vessels.

The theory of hemorrhage in the region of the optic chiasm was corroborated by the development of superior hemianopia, since the latter could easily be explained by the

pressure of the clot upon the fibres contained in the inferior portion of the optic nerves and corresponding to the upper part of the visual field. The phenomena exhibited by the pupils were also in harmony with our hypothesis. The paralysis of the facial nerve was considered as a remnant of the attack of hemiplegia which he had suffered before. Basilar hemorrhages are known to occasionally produce anosmia and ageusia. These two symptoms were present in our case and did not militate against our diagnosis.

The following notes of the remainder of the patient's history are the result of inquiries which I made among his relatives.

His general condition and that of his eyesight remained unchanged. He could go about alone and was able to visit his brother, who lived forty-five minutes' walk from the poorhouse. He had no further stroke of apoplexy. His death occurred nine months and a half after the sudden attack of blindness, and was caused by the incarceration of a hernia.

The result of the *post-mortem* examination performed by Dr. Weichselbaum, was recorded as follows :

Atheromatous changes of the arteries at the base of the brain. Old hemorrhagic foci in the temporal lobe, the lenticular nucleus, the medullary substance of the frontal lobe, and the cortical substance of the sulcus olfactorius of the right hemisphere, the parietal lobe and the optic thalamus of the left hemisphere. Chronic pachymeningitis.

Eccentric hypertrophy of the left ventricle of the heart.

Incarcerated scrotal hernia on the right side. Diphtheritic inflammation of the mucous and serous coats of the prolapsed portion of the intestine. Incipient inflammation of the remaining portions of the intestine.

Consolidation of the apex of the left lung. Firm pleuritic adhesions and emphysema of the right lung.

No mention is made in this record of hemorrhage in the neighborhood of the chiasm, the optic nerves or tracts or anywhere at the base of the brain, nor of fracture or fissure of the skull. Our diagnosis of hemorrhage in the neighborhood of the chiasm, therefore, is proved to have been

erroneous, but the lesions as described do not help to explain the symptoms observed during life.

The record furnishes no clue which would enable us to determine the chronological succession of the hemorrhages. The time which had elapsed after the hemorrhages had taken place had perhaps been too long, so that their relative dates could not be made out at the autopsy even if attention had been paid to this particular point. This is a serious drawback, and renders the difficult task of interpreting the clinical history still more difficult.

When the patient met with the accident by falling from a ladder, he became unconscious and bled from his mouth, nose, and ears. This was most probably due to a fracture of the base of the skull, and it is remarkable that no trace of it was found at the autopsy, but it is possible that it was overlooked. The pachymeningitis (which was recorded) could have been the consequence of such a fracture.

His memory and his will-power had been permanently impaired by the accident, but there was no paralysis at the time. We have to turn to the frontal lobes for an explanation of these clinical features.

Ferrier,[1] speaking of the effects of the removal or destruction by the cautery of the antero-frontal lobes in monkeys, says that these operations are not followed by any definite physiological results. "The sensory faculties, sight, hearing, touch, taste, and smell, remain unimpaired. The powers of voluntary motion are retained in their integrity, and there is little to indicate the presence of such an extensive lesion, or removal of so large a part of the brain." "And yet, notwithstanding this apparent absence of physiological symptoms, I could perceive a very decided alteration in the animal's character and behavior, though it is difficult to state in precise terms the nature of the change." "While not actually deprived of intelligence, they had lost, to all appearance, the faculty of attentive and intelligent observation." This faculty of attention Ferrier considers to be dependent upon the action of the inhibitory centres, since it is necessary to suppress every impulse of motion in

[1] "The Functions of the Brain," p. 78.

order to concentrate attention. The development of the will-power is also dependent upon the development of the inhibitory centres, since with the progressive development of these centres the actions of the will lose impulsive character, and assume the appearance of conscious determination. In our case a clot was found in the right frontal lobe which was probably at the bottom of the loss of memory and will-power. It is reasonable to suppose that the hemorrhage was due to a lesion *by contrecoup* at the time when the patient fell from the ladder and struck the back of his head.

The hemorrhage found in the right lenticular nucleus was probably the cause of the left-sided hemiplegia which supervened a few months after the accident of the fall from the ladder. Hemiplegia is so frequently caused by hemorrhage into the lenticular nucleus, that in every case of hemiplegia we have first to think of hemorrhage in that region, and, as Nothnagel puts it, the odds are greater of finding it in that part of the brain than in any other part. Unless the clot is very small, hemiplegia invariably results. If the internal capsule is not involved, the hemiplegia soon disappears as it did in this case.

The next feature of the clinical history to be explained, in the light of the anatomical data, is the sudden amaurosis of both eyes, which supervened a short time after his recovery from the stroke of one-sided paralysis. No one of all the lesions found could have produced complete blindness singly, and the conclusion is forced upon us that it was the result of two simultaneous hemorrhages. The following combinations have to be taken into consideration:

1. *Right lenticular nucleus and left optic thalamus.*
2. *Right frontal lobe and left optic thalamus, and,*
3. *Right temporal lobe and left optic thalamus.*

Lesions of any of the single organs named may produce homonymous hemianopia, and the combinations enumerated would result in bilateral hemianopia of both eyes, *i. e.*, complete amaurosis.

The lesion of the right lenticular nucleus which enters into the first combination, having already been utilized to

explain the hemiplegia, ought not to be taken into consideration under this head. It is true that a lesion of the lenticular body can cause both hemianopia *and* hemiplegia, but in our case the hemiplegia preceded the blindness by several weeks.

*Second combination: right frontal lobe and left optic thalamus.* A clot in the frontal lobe, if sufficiently large, could compress the optic nerve of the same side and the chiasm, and by compression of one lateral half of the latter produce hemianopia. The lesion of the frontal lobe has, however, been made use of before as a substratum for the phenomena which were observed after the accidental fall from the ladder. Aside from this, there were other circumstances which render it improbable that the hemorrhage in this lobe should have had any share in the production of the visual disturbance. A clot formed in this locality would have exerted far more pressure upon the optic nerve itself than upon the chiasm. Consequently the right eye would have remained blind for some time after the inner half of the retina of the left eye had regained its power. This, however, was not the case. The right eye began to recover simultaneously with the left, and light thrown into the former elicited contraction of the left pupil. If the right optic nerve had been involved alone, the blindness would not have been complete, as the function of the nasal half of the left retina would not have been abrogated.

*Third combination: Right temporal lobe and left optic thalamus.* A hemorrhagic clot in the right temporal lobe, sufficiently large to exert pressure upon either the optic tract, the thalamus, the lenticular nucleus, or the corona radiata, would cause left-sided hemianopia. According to Ferrier the centres for smell and for taste are located at the apex of the temporal lobe. In our case both these senses were impaired. The fact that no motor disturbance was present does not militate against it, since it is an established fact that lesions of the temporal lobe, while producing in some instances the same motor symptoms as do lesions of the lenticular nucleus, will, in others, not produce any.

It is improbable that a clot capable of exerting so much

pressure should not also have compressed the right peduncle or the corpus striatum according to its situation. The implication of the former would in all probability have caused hemiplegia and that of the latter would certainly have done so. Hemiplegia, however, did not coexist with the blindness. Neither was there any hemianæsthesia of the face which is always associated with anosmia and ageusia whenever these defects are caused by lesions of the temporal lobe. It is possible, after all, that the clot in the temporal lobe caused only partial compression of the peduncle, in which case the amaurosis was caused by the clot in this lobe in conjunction with that found in the right thalamus.

An hypothesis which could explain the amaurosis on the basis of a single lesion would certainly be more plausible than any based on the assumption of simultaneous bilateral lesions. Let us see whether the focus found in the left optic thalamus could not in itself explain the ocular symptoms. The hemorrhage evidently did not take place in the posterior third of that organ, since a lesion in that place would have produced hemianopia of the opposite side, whilst we had to do with complete amaurosis. We must therefore locate the clot in the two anterior thirds of the thalamus. There a clot may exist without causing any disturbance of vision. But let us suppose that it was large enough to exert pressure upon the right as well as the left anterior tubercles of the corpora quadrigemina, but without influencing the posterior tubercles. The result would have been amaurosis, dilation with immobility of the pupils and immobility of the eyeballs—just the clinical picture observed in our case. The optic thalamus being a relatively small portion of the encephalon, a clot contained within its limits must necessarily also have been of limited dimensions, even though it may have compressed the anterior corpora quadrigemina, and capable of rapid absorption. This inference harmonizes with the prompt improvement which took place in the ocular symptoms. The conjugate upward paralysis, which remained long after the other muscles of the eyeballs had regained their power, also points to the im-

plication of the anterior tubercles of the corpora quadrigemina.

The objection might be raised against this explanation, that since according to it the left anterior tubercle was more involved than the right, right-sided homonymous hemianopia ought to have preceded the attack of total blindness, and ought again to have been observed for some time after the complete amaurosis had ceased. This objection, however, will be found to carry little weight, if we take into consideration that the individual concerned was of low mental capacity, that his sight had never been of the best, that the loss of sight was very sudden, and that his consternation at the time must have been very great indeed. These circumstances combined tend to prove that his power of observation was not very accurate.

The theory of the production in this case of complete amaurosis by a hemorrhagic focus in the left optic thalamus leaves several of the coëxistent symptoms without any explanation, but this is of little importance. The anosmia may have been of extra-cerebral origin. As to the ageusia, our knowledge of the conditions which give rise to it is so limited that we cannot be called upon to explain its origin in our case.

In conclusion we have to repeat that there is nothing in the record of the autopsy upon which could be based an explanation of the superior hemianopia observed during life. So much is certain that it was of extra-ocular origin. If we consider the interweaving of the optic-nerve bundles as described by Kellermann, and the fact that the uncrossed nerve bundles have been frequently observed to pass to the lower aspect of the optic nerves, it would seem doubtful, whether compression of the inferior portions of these nerves could produce superior hemianopia.

# REPORT ON 1,420 CATARACT EXTRACTIONS PERFORMED AT THE UNIVERSITY OPHTHALMIC HOSPITAL, IN MUNICH, BY PROF. V. ROTHMUND, FROM APRIL 1, 1868, TO APRIL 1, 1883.

By Drs. O. EVERSBUSCH and J. PEMERL, in Munich.

Translated by Drs. M. L. King and C. Zimmermann, of New York.

THE following report is the continuation of that which Dr. Dantone compiled from the books of the Munich University Eye Hospital, and published fourteen years ago. Although detailed reports on more or less extensive series of extractions of cataract have of late become rather numerous, we thought the publication of the following to be justified by these reasons:

1. Few reports only, deal with numbers as large as ours. Large numbers are, as all know, very important in a question of an essentially practical nature. We shall, however, not try to deduce from our material, decisive propositions, quasi in the form of theorems, nor shall we attempt to arrive at certain conclusions by the assistance of the computation of probabilities, for we are fully aware of the insurmountable difficulties in the critical appreciation of a sum total composed of so many dissimilar elements. As a more or less equable factor, may be mentioned that all the operations of this report have been performed by one man —Prof. v. Rothmund.

2. We have endeavored to present and utilize our material from as many points of view as seemed possible. Apart from inquiring what influence may be attributed to the age of the patients, the maturity and character of the

cataract, the accidents during the operation, the reactive processes, and complicating diseases (as Knapp and others have done), we have thought it worth while to ascertain what results were obtained when both eyes were operated on at the same time.

Considering the recent changes in the principles of surgical management of wounds, it seemed a matter of course to inquire, whether, all things being equal, the so-called antiseptic dressing showed a demonstrable advantage over the former methods. Further, we have tried to learn in what way the visual acuteness, obtained or not obtained by the extraction of the cataract, could be improved by an after-operation. Lastly, we have endeavored to ascertain how the primary visual acuteness changes in the course of years, and whether the result of the operation on one eye could serve to determine the prognosis of the other.

3. Whatever may be said against statistical inquiries, the experienced critic will not deny a certain value to the truthful and unbiassed presentation of the results of our operations.

$S\frac{1}{\infty}$ has been considered a failure as long as S has not been improved, either by spontaneous absorption of remnants, or by a secondary operation.

All cases of traumatic cataract have been excluded, because in many of them grave injury to essential parts of the eye were prejudicial to a good result. Before we consider the different operative methods, we may be permitted to discuss some points of a general nature.

First, the question, still mooted with great animation: **Shall, in cataract-operations, antisepsis be used, or not?**

Almost simultaneously with Horner and Schiess, the surgeons of the ophthalmic clinic in Munich began to use antiseptics (salicylic acid and salicylated jute) in cataract-operations, as well as in iridectomies. But, as may be inferred by reviewing the histories of the years from 1870–80, this method of dressing was only utilized in comparatively few cases. During the following two years the old and well-known manner of dressing with adhesive plaster was used, though occasionally Arlt's bandage was employed. After

the year 1877 the journals again devoted some space to antisepsis, the antiseptics employed being salicylic acid and a two-per-cent. solution of carbolic acid. It was only after the beginning of the year 1878 that the new method of treatment became prominent. Owing to the publications of A. Graefe, Just, and others, their methods were often used, some even going so far as to apply a full Lister dressing, but a few bad results following, Graefe's method of treatment again came into use. Notwithstanding all this, we find several months later that antisepsis has again been revived, and from the spring of 1879 we find a four-per-cent. solution of boracic acid in use. From this time to the date reached by this paper, and for several weeks later, this method of treatment remained in vogue, until it was succeeded by the solution of corrosive sublimate, so warmly recommended by Sattler.

If the reader will consult the journals of the time, he will see that this question of antisepsis has been treated of by specialists in a somewhat prejudiced manner.

On the one side we find those enthusiastic operators who do not scruple to apply to the eye the saying of a celebrated disciple of antisepsis: "If Lister's method be used, the peritoneum may be bruised and torn without detriment"; on the other side we find a set of practical men who see no reason for antiseptic treatment, and who even consider the method likely "to lull the conscience of the operator."

As regards the opponents of antiseptics in cataract-operations, they might at least have been expected to support their judgment by citing their own experience, because the uselessness of a new method of treatment cannot be proven by this or that theory. It also seems to us that the opinion of this or that specialist is influenced by the fact that the adoption of this new method will force them to give up an old and well-tried method of treatment. Occasionally we also hear a colleague, who once in a while uses antiseptics, but has no better, and perhaps even worse, results than usual, exclaim: "These are the consequences of your troublesome antisepsis."

In our opinion the first question to determine is: Is the

use of antiseptics on eyes to be operated on, or which have been operated on, detrimental or not?

We must concede that the application to the eye of a full Lister dressing is neither necessary nor practicable. Objections may be raised against the use of the spray, and especially against the caustic action of the carbolic acid itself. This would be a great objection if a full Lister dressing were used, as the spray would be used at each dressing until the wound of the bulb had entirely healed.

Besides this, it is as yet not even settled whether this method will prevent the access of infection, because of the communication between the air and the eye by way of the nasal duct. This is denied by some authorities, but from observations published in the monograph of Zander and Geissler, it is rendered not improbable.

Steffan's observation, that the concentration of the antiseptic solution used in an operation is soon decreased to a considerable degree by the conjunctival secretion, thus impairing its antiseptic action, must also be considered, especially as this dilution is increased by the constant passage of the watery contents of the conjunctival sac to the lachrymal sac.

All of these objections would be of little force if iodoform be used. Leaving out of consideration the fact that, under certain circumstances, if iodoform be sprinkled on a wound, it may cause mechanical irritation, we must remember that its so-called great antiseptic properties have been rendered doubtful by Sattler's latest investigations. From all these observations we may conclude that asepsis, as practised by Lister, is not applicable in ophthalmic surgery.

But at the same time it seems to be going too far to agree with Steffan in saying that antiseptics in ophthalmology are useless, and therefore superfluous, and that they may be considered more dangerous than useful.

Even Lister's first attempts were made by irrigating with simple solutions of carbolic acid, with which he had improved results. But nowhere does Lister say that "it is necessary that the whole surface of the wound be touched by the antiseptic fluid." But on the contrary he adopted

the spray in order to lessen the irritation caused by the acid solution, and cause less of it to touch the wound; for the same reason he also introduced the protective which is placed between the wound and the layers of carbolized gauze. The principles of Lister's treatment may be expressed in one sentence: "Prevent all chemical and mechanical irritations." Could this be attained without even touching the wounds with an antiseptic, or if a volatile antiseptic could be had, which would render the air surrounding the operator safe, Lister would be one of the first to adopt the new method.

It also appears to us that those persons are wrong, who assume that it is of no importance whether before the operation the lids, etc., be cleansed with an antiseptic solution, or whether the operator have clean hands, or whether after the operation antiseptic materials be used for the dressing. We cannot see why "infectious matter," which may be attached to the parts mentioned, or may be suspended in the air, may not eventually find its way to the wound, as well as the secretion from the lachrymal gland, whose injurious influence on the closure of a corneal wound is acknowledged by everybody.

If any one doubts that the introduction of the "so-called" antiseptic treatment into ophthalmic surgery has not resulted in lowering the proportion of purulent keratitis after cataract extractions to below 2½–3 per cent., we have only to refer to Horner's brilliant results.

As in every new method, a certain number of failures are to be expected, each new failure, even if antiseptics be used, calls for a more thorough cleansing and disinfection of hands, instruments, and the eye to be operated on. We are, therefore, of the belief that we should still persevere in the use of antiseptics, especially as Sattler has found corrosive sublimate to be a non-irritating, thorough antiseptic, even in very weak solutions.

Another cause for using antiseptic precautions lies in the fact that a careful review of the cases lost by purulent infiltration, demonstrates the infectious character of this process. That this injurious result is rendered more

probable by any severe injury to the wound or the area about it (such as pressure when making the incision, or because of a very large lens in excision of the iris), thus rendering the wound more liable to develop these infectious materials, is evident to all the supporters of antiseptic procedures. Holstein totally ignores Lister's views, when, speaking of the question of antiseptics in ophthalmology, he says, "antiseptics can only be of use when septic infection be present." Such a wilful misconception of the principles of antisepsis (or, as Lister's pupil, Cheyne, suggests, asepsis) is on a par with that of a surgeon who, in a case of complicated fracture of the thigh, begins the use of a Lister dressing only after suspicious chills have made their appearance.

As has been mentioned, we have of late years used in our clinic the boracic acid and the so-called borated lint. This lint, and the absorbent material now used by us, because of their coarse meshes, have the power of absorbing a large portion of the secretions of the lids, so that in an ordinary case the lids remain clean, and can be opened without assistance on the part of the operator, and it is then only necessary to remove the secretion from the conjunctival sac. Of late years we have laid stress on this latter fact, because a careful cleansing of the conjunctival sac will prevent infection from the stagnating conjunctival secretion.

Before the time of antiseptics, the dressing itself consisted of several layers of charpie, which filled the depression between the cheek, the superciliary ridge, and the nose, and was kept in place by several parallel bands of adhesive plaster.

The dressing with borated lint (two wet layers as a rule) was supplemented by a pad of salicylated cotton (eleven per cent.) supported by a flannel bandage.

But as many patients, especially in warm weather, found this dressing unpleasant, we have, since the discovery of the corrosive-sublimate treatment, adopted a modification of Arlt's dressing (several layers of absorbent material soaked in a solution of corrosive sublimate, adhesive strips, flannel bandage), such as we have seen used by Professor Sattler.

In normal convalescence the eyes remain bandaged until the fifth day after the operation, the bandage being renewed at each morning visit. In former years, in addition to this, an ice-compress was applied to the eyes during the day, the dressing being changed in the evening. Even this treatment has undergone a modification within the last four or five years, in that the eyes are now only protected by blue glasses during the day, provided the convalescence is normal. It has seemed to us that the use of ice compresses easily caused a maceration of the skin, which only disappeared after some time ; this is more apt to take place in old people whose skin is relaxed.

As regards precautionary measures *before* the operation, any chronic or acute conjunctivitis, or any disease of the tear passages, was either cured, or at least its most marked symptoms were relieved, before the operation was begun.

Prof. v. Rothmund lays considerable stress upon the preparation of the patient for the operation by rehearsing the steps to be gone through, and the various positions to be assumed by the eye, and also by accustoming the patient to have the eyeball touched by the fingers and the fixation forceps. One or two days before the operation a saline cathartic is given in order to guard against any severe exertion of the patient for the first few days following the operation. Differing somewhat from the practice of other operators, all cataract patients in our clinic are kept in bed four to five days ; they are not required, however, to remain on the back or side, but they are often allowed, and even advised, to sit up in order to guard against hypostatic pneumonia. If they are not kept in bed some days, they assume that the danger has already disappeared, that they have nearly recovered, and as a result they are not as careful about their eyes, rubbing them, and beginning to use them, etc.

During the first few of the years we refer to, all operations were done after the pupil had been well dilated with atropine. Objections similar to those mentioned by Becker, Hippel, Horner, E. Meyer, and other well-known clinicians, against the use of mydriatics before operation, have also

caused the managers of the clinic at Munich to cease using atropine before the operation.

But as it is very necessary in cataract cases, and also in some operations, to see as much as possible of the lens, homatropine has come into use for that purpose; the operation is not to be begun until the pupil has reached its usual size.

Within the last fifteen years the indications for the use of atropine after the operation have become so limited, that in an operation involving a segment of the iris in normal condition no atropine is used at all. In the various forms of iritis, and when protruding cortical masses are present, atropine is only used after the wound has closed and the anterior chamber has reappeared. But in cataract extraction by means of the flap-operation, it was customary not only to use atropine before but also after the operation, the maximum dilatation being prolonged for several days.

Within the last three or four years atropine, prepared with salicylic acid, has been used instead of the sulphate of atropia. Eserine was only used a few times.

With few exceptions all cataract operations were done in the forenoon. The so-called Heidelberg operating-chair was generally used; only in isolated cases were patients operated on in bed. This operating-chair has many important advantages; not only can the patient operated on be brought into any position wished, but it can also be turned about as regards the illumination; the operator has greater freedom of movement, and his assistant can help him more efficiently. The danger of moving a patient to a bed, after loss of vitreous humor, may be guarded against by some extra attention in putting on the compress, which should press on the eye evenly.

In the old clinic, which was very much overcrowded, it was impossible to have a change of rooms after the operation. In this respect also we are much better off than in 1879, because, since the new building has been used, the rooms can be changed. In this way the rooms in which the patients remain from six to seven days may be thoroughly cleansed and then aired for eight to ten days.

Because of the somewhat phlegmatic temperament of the old Bavarian and Tyrolese people—and these constituted most of our patients,—it was exceptional that chloroform narcosis was necessary. It is superfluous to again discuss the pros and cons of anæsthesia in cataract operations. According to our views no one is justified in saying that anæsthetics are never necessary.

After we have had the opportunity of once seeing how restless a patient occasionally is, as soon as the speculum is introduced, and how he becomes more and more excited as the operation progresses, we will readily acknowledge that chloroform is very useful in a certain class of cases. In this respect we must depend considerably on the quality of the material at hand, and this explains why Hippel, among others, could not do without chloroform in his clinic.

During the first four to six days the diet consists of fluid food, which assists in rendering the patient more quiet.

As has been mentioned, the dressings were changed daily, preferably in the morning.

Until within a few years it was considered of the greatest importance to avoid touching the eyelids, or opening them, for the first five days, unless there was some indication for it.

After several cases of purulent infiltration of the vitreous and suppuration of the cornea had occurred, unaccompanied by pain, this rule was not observed, the wound being inspected at an earlier date.

These deleterious processes, which can only be considered as true infectious changes, as Horner has so well shown, were first noticed in that part of the dressing touching the eye. Since we have paid special attention to the matter, we have always found, even if no pain be complained of, when the dressing was changed the first time (about twenty hours after operation), that the lint next the eyelids (which, in normal convalescence, only becomes slightly soiled by serum, and perhaps a little mucus) had already become covered by a fluid, sticky, and purulent secretion, that formed a distinct layer on the dressing, becoming more and more copious within the following days. In these cases, at

the same time, the tense "red" œdema of the lids, especially the upper one, was so well marked, that it was impossible to confound it with the well-known pale œdema, depending, perhaps, on serous infiltration. (This was noticed most frequently when the speculum had been used longer than usual.)

These facts show that it is not well to inspect the wound carefully only when pain is complained of. This custom is sometimes supported by saying that after purulent infiltration has once set in, the eye cannot be saved by any therapeutic measures, and that the early inspection disturbs the normal convalescence, and is therefore opposed to the adoption of a safe permanent dressing.

In this respect also are the results attained by Horner, by using antiseptics energetically in cases of beginning suppuration, adapted to render the prognosis more favorable. They admonish us to abandon our passive position in regard to these desperate cases, and to try and save whatever we can.

The treatment of those somewhat more benign reactive processes as represented by the so-called plastic iritis (adhesive iritis [Becker], true plastic iritis, iridocapsulitis, relapsing iridocyclitis), was not materially different from the methods adopted by other clinicians. The same may be applied to the treatment of diabetics and habitual topers.

In only one case, and that in an old decrepit woman (who could not be accused of being a toper), have we had maniacal attacks the first day after operation, increasing in degree the following night, so that it was thought well to remove the dressing, after which the patient became more quiet.

As a rule, patients were discharged from the institution —excepting, of course, severe, complicated cases—from the fifteenth to twentieth day. The minimum time of remaining in the hospital was sometimes shortened, in cases of people living in the vicinity, and who we were sure would be well taken care of outside; but to offset this, the time of residence in the hospital was lengthened in cases of operation on persons from the country, this depending, of course, on the distance, and on the possibility of the eye being looked after until it had recovered.

We were shown to be in some respects justified in keeping such patients until total convalescence, by the fact that only 20% returned after 3–6 months, as requested. For the same reason, all patients from a distance were provided with suitable glasses, with the most imperative orders, of course, not to use them until the eye is perfectly free from irritation, or not sooner than three months after leaving the hospital.

The results included in this report, are the results arrived at by testing the eyes the day before the patient's discharge. The degree of vision attained in this manner, when compared with that of other observers (in which, as a rule, *the time* at which they were taken is not indicated), is much lower, lower still from the fact that even in cases of ophthalmoscopic proof of corneal astigmatism, the examination with the optometer gave an almost negative result, especially in the rural patients.

The relative frequency of an insufficient visual result ($V \frac{1}{60} - \frac{1}{200}$), as shown in our tables, is also accounted for by an extraneous cause.

In many of the operated cases—and this includes the cases from rural districts, which form the larger part of our patients—very acute vision is not necessary for the pursuit of their vocations. These results are also influenced by very material causes; quite a large proportion of these patients are dependent on their towns for support, and they are thus not anxious for very good sight. In many cases in which a second operation promised the best results as regards vision, permission was either absolutely refused, or rendered impossible by the non-appearance of the patient at the time agreed on.

The practice of men of experience shows also, that the longest possible time should elapse between the primary and secondary operations; very rarely is the second operation done within one month, mostly in the second and third months, and often still later. These principles are coming more and more into general use.

In the statistics given below, there are quite a number of cases in which cataracts were extracted from both eyes at one sitting.

Even if the percentage of reactive processes and poor results is but slightly, if at all, different from the results obtained in double cataracts, not operated on at the same time, still, Prof. Rothmund has of late years only exceptionally done a double operation, thus taking the views now generally accepted by the most cautious operators. But v. Rothmund is still of the opinion, that a unilateral cataract may be operated on, even if the vision of the other eye be entirely intact.

It would unduly lengthen this article, and also be tiresome to our readers, were we to give the histories of the operations. At the present time, we will restrict ourselves to a general report of the statistic results, giving briefly the main points of the most interesting cases, reserving for a future report the detailed description of the reactive processes and operations secondary to the extraction of cataract.

As regards the method of operation, the 1,420 extractions are divided as follows: In 926 cases—that is, 65⅓ %—the extraction was done by an upward flap with Graefe's knife; thirty-eight times, or 2.7 %, the flap was made in an upward direction, using Rothmund's knife; in 103 cases, = $7\frac{3}{10}$%, a scleral flap was made below with a small Graefe's knife; in 166 cases, the latter method was used with Rothmund's knife; in sixty-three cases, = 4.4 %, the operation was preceded by an iridectomy.

The remainder of the cases was done as follows:

Extraction with corneal flap:

| | | | |
|---|---|---|---|
| (*a*)—Flap below | 42 | times | = 2.9 % |
| " above | 4 | " | = 0.3 % |
| Critchett's method | 28 | " | = 1.9 % |
| Extraction with capsule | 17 | " | = 1.2 % |
| Liebreich's method | 12 | " | = 0.8 % |
| Ad. Weber's " | 10 | " | = 0.7 % |
| Wecker's " | 5 | " | = 0.4 % |
| Ed. Jäger's " | 2 | " | = 0.25 % |

In one of the histories is found the note: Secd. operated on by Arlt; besides this, one extraction was done from within, and one by a scleral flap from below with a lance.

In one case the iridectomy was followed by a glaucomatous cataract.

The visual results of all operations taken together is as follows:

| | | | | |
|---|---|---|---|---|
| 980 | operations | = 69 % ; V = 1 | $-\frac{1}{10}$ | inclusive |
| 157 | " | = 11.1 % ; " = $\frac{1}{10}$ | $-\frac{1}{20}$ | " |
| 68 | " | = 4.8 % ; " = $\frac{1}{20}$ | $-\frac{1}{60}$ | " |
| 34 | " | = 2.4 % ; " = $\frac{1}{60}$ | $-\frac{1}{100}$ | " |
| 113 | " | = 7.9 % ; " = $\frac{1}{100}$ | $-\frac{1}{\infty}$ | " |
| 68 | " | = 4.8 % ; " = 0 | | |

Secondary cataracts, which, in the following statistics, are only noted when they exerted some influence on the visual result attained, were present in 225 cases (15.8 %). (In these we included all cases in which vision was less than $\frac{1}{10}$.)

As regards the visual results attained (Snellen's test-types were used), the first and second classes may be put under the head of "good, medium, or partial success." The third and fourth groups may be compared to those under the head of "moderate or slight success." Those in which the results are given as $V = \frac{1}{\infty}$, may be considered, at present, as unsatisfactory; but these cases were all of the kind which promised improvement in sight, either by absorption of the secondary cataract, or by a second operation.

Although this method of classification is imperfect, in that the best visual results—such as $V\frac{1}{1}$, $V\frac{1}{2}$, $V\frac{3}{4}$—are placed in the same category with $V\frac{1}{10}$, it gives all its results in definite figures, which is in marked contrast with statistics generally, in which it is customary to use the vague terms "good, medium results," etc. We may also remark that, in contrast to various other similar tables, ours are based only on the results of distant vision, leaving out of consideration vision at short distances, in which, as is well known, the acuteness of vision is always greater than in distant vision.

At a first glance at the tables, the high percentage of complicated operations seems unexplainable, in contrast to those of other observers, but in these cases even the

slightest variation from the usual method of operation, by which the wound or the surrounding parts are exposed to any more danger, is classed under the head of complication, —for instance, a cystotomy repeated twice, or prolonged use of the spoon—things, which, if left out of account, would materially lower the percentage of complicated operations. For the same reasons, the tables showing the progress after operation, show a much higher percentage of complications than other reports.

### I.—Upward Extraction with Graefe's Knife.

We intentionally avoid the much misused expression: "peripheral linear" extraction, because the procedure described under this expression (or also called Ext. sec. Graefe) in our series of operations, is not the true peripheral linear extraction, except in a minority of cases. Just as Minalt has reported of Horner's methods of operation, we must also call attention to the fact that while v. Rothmund, for the first few years of the time we are treating of, was inclined to adopt Graefe's method, later on he increased the height of the flap, at the expense of its being a peripheral incision. It would be of interest to know in how far the result of these operations was influenced by not using Graefe's incision. While it would be desirable to know this, the histories themselves give but little information, as in most of them, especially those followed by a normal convalescence, the operation is passed over with the following notice: "Ext. lin. sec. Graefe." We are therefore obliged to give up any attempts at separating those operated on according to Graefe's directions, and those operated on by Jacobson's or Horner's method.

Of equal importance in preventing a classification of this kind, is the fact that only in the last 6–7 years have efforts been made to form a conjunctival flap, this having been totally neglected before. We must also mention the fact that the incision in the sclero-corneal junction, instead of being perfectly horizontal, deviated toward the nose and downward, especially if the scleral tissue presented considerable resistance, so that the bulb turned, the point of exit of the knife thus being below the horizontal line.

Regarding the technique of the operation, we only wish to call attention to those points differing from the usual procedure. Instead of the ordinary fixation forceps, v. Rothmund for years has used a curved forceps, serrated at its broad ends. V. Rothmund thinks that this modification has the advantage that if, in excision of the iris, the eye moves upward, it is easier for the assistant who holds the forceps, to draw the bulb down, avoiding at the same time any pressure on the bulb.

In forming a coloboma of the iris, v. Rothmund has, within the last five years, preferred using the scissors curved on the flat, invented by von Wecker for iridotomy. In cases operated on within the last few years, the laceration of the capsule was often done in the manner proposed by Knapp, using a sickle-shaped knife in place of the ordinary cystotome. The removal of the lens was, as a rule, accomplished by means of pressure, and the removal of any remaining cortical portions was done by pressing the lower lid upward against the cornea with the finger; in former years, if this did not succeed, the region of the pupil was cleansed by means of instruments (with the so-called small Daviel's scoop or spoon); this procedure has gradually fallen into disuse, and v. Rothmund, as well as other experienced operators, would rather, under such circumstances, forego having a totally clear pupil, than expose themselves to the dangers attendant on again entering the wound with instruments.

If the lens could not be removed by pressure, or by sliding pressure with the finger against the lower lid, then the cartaract was removed by means of a sharp spoon. In these cases, Pagenstecher's spoon, the loop, or the hook were seldom used. These instruments were used when prolapse of the lens was threatening.

The rupture of the vitreous body, so warmly recommended by von Rheindorf, has only been tried once. No bad effect was noticeable either in reference to the progress of the case or in the vision attained. Professor v. Rothmund could not decide to give the method a further trial.

Before the dressing is put on, the wound is carefully in-

spected and cleansed (unless rendered it inadvisable by loss of vitreous), particular attention being paid to removal of blood coagula and remains of lens-matter between the edges of the wound; of late, considerable attention is paid to the exact position of the edges of the coloboma, they being adjusted by slight rubbing on the lids, or with a Wecker spatula.

We have not sought to give a report of the results of each year, because the results of the various years, especially as regards vision, were much the same. The same is true as regards the number of operations on males and on females. No material difference has been found as to the frequency with which the two eyes were affected.

The following tables show the results of the statistics:

The *general* result attained in the 926 cases (65.2 % of all cases) shows $V = 1 - \frac{1}{10}$ in 668 cases (72.1 %); $V = \frac{1}{11} - \frac{1}{20}$ in 99 cases (10.7 %); $V = \frac{1}{21} - \frac{1}{60}$ in 35 cases (3.8 %); $V = \frac{1}{60} - \frac{1}{200}$ in 19 cases (2.1 %); $\frac{1}{\infty}$ with hope of a good result by a second operation included 66 cases (7.1 %); in 39 cases (4.2%) $V = 0$ or $\frac{1}{\infty}$ without hope of improvement. In 134 cases (14.4 %) well-marked secondary cataract was present (*i. e.*, enough to cause less acute vision).

If from the whole number we subtract the cases of cataract. accreta, the number of negative results is lowered from 4.2 % to 3.9 %, which, although below the best results of Graefe, Horner, Schirmer, Völckers, may still be put on a par with the usual results of the better class of operators.

The proportion of less satisfactory results is comparatively large. This is explained by the circumstances already mentioned. If all the cases included under $V - \frac{1}{10}$ and up to $\frac{1}{20}$ be taken as being good results, the percentage is 82.8, which is not as high as those given in reports by Arlt, Bäuerlein, Hirschberg, Horner, Kerschbaumer, Knapp, Little, Pagenstecher, Schiess, Schirmer, and others, but at the same time they may be considered as good results for men of medium experience. This percentage would have been slightly higher, if we had considered the secondary results, as Völckers and others have done.

Grouped according to **age**, the 926 extractions may be arranged as follows:

| Age. | Number. | Visual Results. | | | | | $\frac{1}{\infty}$ Hopeless or 0 |
|---|---|---|---|---|---|---|---|
| | | 1 — $\frac{1}{10}$ | — $\frac{1}{20}$ | — $\frac{1}{50}$ | — $\frac{1}{100}$ | $\frac{1}{\infty}$ | |
| | 0,64% | 33,3% | 16,7% | — | — | 50,0% | — |
| 10—20 . | 6 | 2 | 1 | — | — | 3 | — |
| | 1,72% | 81,25% | 6,25% | 12,5% | — | — | — |
| 20—30 . | 16 | 13 | 1 | 2 | — | — | — |
| | 30,2% | 85,7% | 7,1% | 3,6% | — | 3,6% | — |
| 30—40 . | 28 (1) | 24 | 2 (1) | 1 | — | 1 | — |
| | 7,45% | 72,5% | 13,0% | 4,35% | 1,45% | 7,25% | 1,45% |
| 40—50 . | 69 (4) | 50 (2) | 9 (2) | 3 | 1 | 5 | 1 |
| | 24,51% | 77,9% | 7,9% | 2,6% | 0,9% | 6,2% | 4,4% |
| 50—60 . | 227 (4) | 177 (2) | 18 | 6 | 2 | 14 (1) | 10 (1) |
| | 43,08% | 70,4% | 11,0% | 4,0% | 2,5% | 7,3% | 4,8% |
| 60—70 . | 339 (32) | 281 (19) | 44 (3) | 16 | 10 (2) | 29 (6) | 19 (2) |
| | 17,82% | 67,9% | 13,3% | 3,6% | 3,6% | 7,9% | 3,6% |
| 70—80 . | 165 (16) | 112 (12) | 22 | 6 | 6 (1) | 13 (1) | 6 (2) |
| | 0,75% | 28,55% | — | 14,28% | — | 14,28% | 42,9% |
| 80—90 . | 7 | 2 | — | 1 | — | 1 | 3 |
| | 0,97% | 77,8% | 22,2% | — | — | — | — |
| Not noted | 9 | 7 | 2 | — | — | — | — |

It seems useless to try and come to any conclusions from these or the following statistics as to age, because the proportions included in the various decades are too irregular to be useful in forming any truthful deductions Those included from the 50—80 years would be of most value, but only in showing that the result of the operation did not seem to be influenced at all by age.

The following classification of the influence of the **variety of cataract** on the visual result only varies from Knapp's plan in that catarac. Morgagn. is given a separate column. The remarkably small number of nephritic cataracts can only be accounted for by the fact that the urine of cataract patients has only been examined regularly since Deutschman published his observations.

It seems unnecessary to explain this table. Objection may be made perhaps, and not unjustly, to the use of the term cataract. maturescens, and we know very well that the expressions "nearly ripe," etc., are very uncertain, to say the least, and, as Förster has already remarked, the well-known guides as to the ripeness of the cataract (opaqueness of pupil, absence of the shadow of the iris) are often not sufficient.

In classifying the various cases we have, therefore, con-

| Character of Cataract. | No. | Visual Results. | | | | | | Course of Operation. | | | Course of Healing. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 1/10 | 1/10 | 1/50 | 1/100 | 1/∞ | 0 | n. | Complicated. | Loss of Vitreous. | n. | c. |
| | 73,3% | 74,4% | 10,3% | 3,4% | 1,5% | 6,5% | 3,9% | 49,7% | 50,3% | 8,5% | 51,4% | 48,6% |
| Cat. matura . . | 679 | 505 | 70 | 23 | 10 | 44 | 27 | 338 | 341 | 58 | 349 | 330 |
| | 9,8% | 68,1% | 12,1% | 5,5% | 4,4% | 4,4% | 5,5% | 54,9% | 45,1% | 5,5% | 41,8% | 58,2% |
| Cat. maturescens . | 91 | 62 | 11 | 5 | 4 | 4 | 5 | 50 | 41 | 5 | 38 | 53 |
| | 7,5% | 59,4% | 15,9% | 8,7% | 15,9% | 11,6% | 2,9% | 33,3% | 66,7% | 11,6% | 42,0% | 58,0% |
| Cat. hypermat. . | 69 | 41 | 11 | 6 | 11 | 8 | 2 | 23 | 46 | 8 | 29 | 40 |
| | 0,2% | 100,0% | — | — | — | — | — | 50,0% | 50,0% | — | 50,% | 50,0% |
| Cat. Morgagn. . | 2 | 2 | — | — | — | — | — | 1 | 1 | — | 1 | 1 |
| | 1,5% | 85,7% | 7,14% | 7,14% | — | — | — | 35,7% | 64,3% | 14,3% | 57,1% | 42,9% |
| Cat. mollis . . | 14 | 12 | 1 | 1 | — | — | — | 5 | 9 | 2 | 8 | 6 |
| | 0,4% | 100,0% | — | — | — | — | — | 100,0% | — | — | 25,0% | 75,0% |
| Cat. zonularis . . | 4 | 4 | — | — | — | — | — | 4 | — | — | 1 | 3 |
| | 0,1% | — | — | — | 100,0% | — | — | — | 100,0% | — | — | 100,0% |
| Cat. glaucomat. . | 1 | — | — | — | 1 | — | — | — | 1 | — | — | 1 |
| | 0,2% | 100,0% | — | — | — | — | — | — | 100,0% | 100,0% | 50,0% | 50,0% |
| Cat. luxata . . | 2 | 2 | — | — | — | — | — | — | 2 | 2 | 1 | 1 |
| | 0,6% | 66,7% | — | — | — | 33,3% | — | 66,7% | 33,3% | — | 50,0% | 50,0% |
| Cat. diabetica . . | 6 | 4 | — | — | — | 2 | — | 4 | 2 | — | 3 | 3 |
| | 0,1% | 100,0% | — | — | — | — | — | — | 100,0% | — | — | 100,0% |
| Cat. nephritica . | 1 | 1 | — | — | — | — | — | — | 1 | — | — | 1 |
| | 6,2% | 61,4% | 10,5% | — | 5,3% | 14,0% | 8,8% | 24,6% | 75,4% | 14,0% | 36,8% | 63,2% |
| Cat. accreta . . | 57 | 35 | 6 | — | 3 | 8 | 5 | 14 | 43 | 8 | 21 | 36 |

fined ourselves closely, as far as the descriptions rendered it possible, to the points given by Förster, and for this reason, all the cases of former years in which an unripe cataract was diagnosed (but which later notes show as having a black pupil and good vision) have been placed under the head of ripe cataracts; the cataracts in which mention is made of the formation of a distinct "sector" (absence of the shadow thrown by the iris, and impossibility to illuminate the fundus through the lens) were all transferred to the heading "immature cataracts."

In admitting **cat. accreta** into these and the following tables, which, as a rule, only comprise uncomplicated cataracts, we have been actuated solely by the motive of presenting a general picture of the results of cataract operations. How much influence cat. accreta has on the various anomalies of operation and convalescence, may be ascertained from the special tables, in which it has each time been made conspicuous by being included in parentheses.

CASES.

1. Cat. glaucomatosa, right eye, absolute glaucoma in left eye. Woman, fifty-eight years, very nervous. Immediately after a very carefully performed iridectomy, lens-matter protruded and was easily removed; on attempting to remove a few remaining fragments the patellar fossa burst; there was prolapse of the vitreous about the size of a pea. Adhesive-plaster dressing. On the second day there was considerable chemosis of conjunctiva, and a secondary cataract filling the whole pupil. On the twentieth day patient was discharged with V = $\frac{1}{200}$. Four months later disc. cat. secd. p. corn.; V = $\frac{1}{36}$ (glaucomatous excavation and decoloration of papilla).

2. Cat. semidur. mat. cong. Girl, fourteen years old. Eight weeks previous a discision had been made but had no effect. Extraction without cystotomy. Pressure having no effect, the lens was removed by means of a sharp spoon. Some remnants of the lens were left behind, because there was prolapse of vitreous on using the spoon. Adhesive-plaster dressing. Large secondary cataract, which swells On twentieth day discision per sclero. Excentrically (from without) fingers were recognized at 1–2 feet. Ex. with ophthalmoscope negative. Four years later pupil black; counts fingers at 3–4 feet. General condition unchanged.

3. Cat. moll. diabetic. oc. utr. (Lens began to get cloudy some months ago.) A poorly nourished peasant girl, nineteen years old; never menstruated. Double operation at one sitting (pupils widely dilated). R: Considerable prolapse of iris. Cataract removed by sliding pressure with spoon. Adhesive-plaster dressing. Normal convalescence.

L: Normal operation. Adhesive-plaster dressing. On the fifth day found a large secondary cataract. On thirty-eighth day discision per sclero. $V = \frac{1}{10}$ in both (retinitis).

4. Cat. moll. diabet. oc. utr. Woman, twenty-nine years old. Double operation. Adhesive-plaster dressing. Normal convalescence, except a slight iritic irritation. On the tenth day both eyes normal. $V \frac{5}{10}$.

5. Cat. diabet. oc. ut. Male, twenty-three years old.

L: After the cystotomy the cataract ran out. Adhesive-plaster dressing. Discharged on the tenth day with $V = \frac{1}{3}$.

Two months later operation on right; same course after operation. Adhesive-plaster dressing. On the sixth day considerable hemorrhage into anterior chamber, which was reabsorbed by the tenth day. Discharged on the fifteenth day with $V = \frac{1}{3}$.

6. Cat. mat. dur., left eye. $V = \frac{1}{\infty}$. Cat. non. mat., right eye (?). $V = \frac{1}{10}$. (Pupils still easily illuminable.)

L: Operation normal. Plaster dressing. $V = \frac{1}{3}$. On the sixteenth day eye was free from irritation.

R: Extraction seventeen days p. I. o. Slight trouble in removing lens. Except this, operation normal. Plaster dressing. $V = \frac{5}{4}$. Healed on twenty-second day.

7. Cat. Morgagn. Old decrepit woman, eighty-two years. Pterygium. Immediately after opening capsule, considerable thick fluid drained off. The nucleus is easily dislodged by pressure on lower part of cornea. Plaster dressing. Normal convalescence. $V = \frac{1}{3}$; four months later $V = \frac{1}{2}$.

The influence of the **course of the operation** is shown in the two following tables:

| Operation | No. | Visual Results. | | | | | | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{50}$ | $-\frac{1}{100}$ | $\frac{1}{\infty}$ | 0 | good. | disturbed. |
| Normal | 47,4% | 77,9% | 10,3% | 2,7% | 1,8% | 5,5% | 1,8% | 56,04% | 43,96% |
| | 439 (14) | 342 (12) | 45 (1) | 12 | 8 | 24 | 8 (1) | 246 (6) | 193 (8) |
| Compl. | 52,6% | 66,9% | 11,1% | 4,7% | 2,3% | 8,6% | 6,4% | 42,1% | 57,9% |
| | 487 (43) | 326 (23) | 54 (5) | 23 | 11 (3) | 42 (8) | 31 (4) | 205 (15) | 282 (8) |

| Complications. | No. | Visual Results. | | | | | | Course of Healing. | |
|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{50}$ | $-\frac{1}{250}$ | $\frac{1}{\infty}$ | 0 | norm. | disturbed. |
| | 0,8% | 100,0% | — | — | — | — | — | 100,0% | — |
| 1. Wounding of cornea in counterpuncture | 4 | 4 | — | — | — | — | — | 4 | — |
| | 12,7% | 74,2% | 17,7% | 1,6% | 1,6% | — | 4,9% | 46,8% | 53,2% |
| 2. Complicated iridectomy . . . . . | 62 | 46 | 11 | 1 | 1 | — | 3 | 29 | 33 |
| | 8,8% | 72,1% | 11,6% | — | 4,7% | 9,3% | 2,3% | 37,2% | 62,8% |
| 3. Copious hemorrh. in ant. chamb. . . . | 43 (2) | 31 (1) | 5 | — | 2 | 4 (1) | 1 | 16 | 27 (2) |
| | 15,8% | 72,7% | 9,1% | 3,9% | — | 11,7% | 2,6% | 44,2% | 55,8% |
| 4. Laborious expulsion of lens . . . . | 77 (1) | 56 (1) | 7 | 3 | — | 9 | 2 | 34 (1) | 43 |
| | 1,4% | 57,14% | — | — | 14,28% | — | 28,57% | 14,3% | 85,7% |
| 5. " " " with complic. | 7 | 4 | — | — | 1 | — | 2 | 1 | 6 |
| | 3,9% | 73,7% | 5,26% | 10,52% | — | 5,26% | 5,26% | 57,9% | 42,1% |
| 6. Propulsion of lens . . . . . | 19 | 14 | 1 | 2 | — | 1 | 1 | 11 | 8 |
| | 8,4% | 73,2% | 9,75% | 4,87% | — | 9,75% | 2,44% | 39,02% | 60,98% |
| 7. Remnants of lens . . . . . | 41 (4) | 30 (3) | 4 | 2 | — | 4 (1) | 1 | 16 (3) | 25 (1) |
| | 3,9% | 52,63% | 5,26% | 10,52% | — | 15,79% | 15,79% | 47,4% | 52,6% |
| 8. Loss of vitreous . . . . . | 19 (2) | 10 | 1 (1) | 2 | — | 3 | 3 (1) | 9 | 10 (2) |
| | 7,2% | 45,7% | 8,6% | 14,3% | 5,7% | 8,6% | 17,1% | 22,9% | 77,1% |
| 9. " " with instrumental delivery | 35 (6) | 16 (3) | 3 (2) | 5 | 2 | 3 (1) | 6 | 8 (1) | 27 (5) |
| | 2,1% | 60,0% | 10,0% | 10,0% | — | — | 20,0% | 40,0% | 60,0% |
| 10. " " with remnants of lens . | 10 | 6 | 1 | 1 | — | — | 2 | 4 | 6 |
| | 2,3% | 36,4% | 9,1% | — | — | 36,4% | 18,2% | 18,2% | 81,8% |
| 11. " " with instrum. and remnants | 11 | 4 | 1 | — | — | 4 | 2 | 2 | 9 |
| | 1,4% | 57,14% | 28,57% | 14,28% | — | — | — | 14,3% | 85,7% |
| 12. " " with hemor. in ant. chamb. | 7 | 4 | 2 | 1 | — | — | — | 1 | 6 |
| | 0,2% | 100,0% | — | — | — | — | — | — | 100,0% |
| 13. " " with propulsion of lens. | 1 | 1 | — | — | — | — | — | — | 1 |
| | 23,0% | 67,8% | 9,8% | 3,6% | 3,6% | 9,8% | 5,4% | 49,1% | 50,9% |
| 14. Introduction of instruments in ant. chamb. | 112 (21) | 76 (9) | 112 () | 4 | 4 (7) | 11 (5) | 6 (3) | 55 (5) | 57 (16) |
| | 8,0% | 61,5% | 17,9% | 5,13% | 2,56% | 7,69% | 5,13% | 38,5% | 61,5% |
| 15. " " with complic. | 39 (7) | 24 (6) | 7 | 2 | 1 (1) | 3 | 2 | 15 (5) | 24 (2) |

It is unnecessary to explain the terminology of these tables.

Under the head of "Complicated iridectomy," we have included all the cases in which it was necessary to grasp the iris twice or more when forming the coloboma, or where the iris was not smooth.

Under the headings 5 and 15, "Laborious expulsion of lens with complications," and "Introduction of instruments with complications," are included accidents which are not found under any other head, such as severe contusion of the wound (which was so severe, several times, in the first variety, that the neighboring portion of the cornea seemed to be inverted), or that the removal of the lens only became possible after enlarging the wound by angular scissors or a *couteau mousse*. Division 14, "Introduction of instruments," only includes those cases in which instruments were used for purposes not usual in the normal course of the operation, as, for instance, a reopening of the capsule, or removal of lens and capsular remains with traction-instruments.

CASES.

1. Cat. mat. oc. sinist. Male, aged seventy. Complicated iridectomy and cystotomy. Loss of $\frac{2}{3}$ of vitreous. Boracic-acid dressing. Considerable hemorrhage. Plastic iritis and secondary cataract. V = $\frac{1}{20}$. Length of convalescence, twenty-one days.

2. Cat. mat. oc. dext. Male, sixty-nine years. On removing the lens, at least $\frac{1}{3}$ of the vitreous followed. Funnel-shaped collapse of cornea. Adhesive-plaster dressing. On next day the wound united; cornea regained normal curvature. Twelve days after operation, considerable irritation of iris, which disappeared within a few days. Discharged on the thirty-seventh day with V = $\frac{1}{3}$.

3. Cat. supermat. oc. sin. Female, aged fifty. Cystotomy. Removal of lens rendered difficult by thickened capsule, rendering introduction of spoon necessary; considerable prolapse of vitreous. Adhesive-plaster dressing.

On the afternoon after operation, had a fainting spell; considerable pain in the eye; vitreous in wound; on the fourth day another fainting attack; later on there was entropion of lower lid. V = $\frac{1}{10}$. Convalescence lasted twenty days.

4. Cat. pol. post. oc. dex. Patient seventy years old. Myopic from childhood. Operation normal in all respects. After the wound had been cleansed and he was asked to try his vision, he did it in a jerky, rapid manner, losing so much vitreous that the bulb collapsed. Adhesive-plaster dressing. Convalescence normal. No irritation on the thirteenth day. V = $\frac{1}{3}$. Opacity in vitreous.

5. Cat. moll. oc. utr. Male, aged thirty-five. Catarrhal conjunctivitis. During the operations, fluid vitreous drains from both eyes; lenses removed with the spoon; some lens-matter still remains; adhesive-plaster dressing. Convalescence, with some slight symptoms of irritation. In the right eye a small portion of the iris is fast in the wound. V = $\frac{1}{8}$ in both eyes. Discharged on the thirtieth day. Five months later, V = $\frac{1}{3}$.

6. Cat. hypermat. oc. dex. Male, aged seventy-two. In making the counter-puncture, the iris was accidentally incised and a small piece cut off. It was afterward excised. Considerable hemorrhage in the anterior chamber. The thickened capsule was drawn out by a hook and excised. Lens removed by pressure. During the attempts to remove the cortical portion by pressure on the lids, some vitreous escaped, the patient being very restless. Adhesive-plaster dressing. Normal convalescence. Small secondary cataract. On the twelfth day, V = $\frac{5}{60}$.

7. Cat. mat. oc. utr. Male, aged seventy-seven. Double operation. In removing the lens of the right eye, by pressure with the rubber spoon, the edges of the wound were separated by vitreous, and the corneal flap was tilted. Considerable vitreous was lost.

L E: Normal operation. Convalescence accompanied by very slight symptoms of iritic irritation. V = $\frac{1}{6}$ in both eyes. Dressing applied with roller bandage. Discharged on the eighteenth day.

8. Cat. mat. oc. sin. Female, aged sixty-four. The patient strained so much, that as soon as the Graefe knife was withdrawn the lens with capsule appeared in the wound without an iridectomy being done; there was considerable loss of vitreous. Adhesive-plaster dressing; eserine. Discharged on the twentieth day with V = o (purulent infiltration of the vitreous body).

9. Cat. mat. oc. dext. Female, aged seventy. The lens was removed with trouble; adhesive-plaster dressing. Panophthalmia. V = o. Discharged on twenty-ninth day.

10. Cat. mat. oc. utr. Female, aged ( ? ). Double opera-

ation. R: Normal operation and convalescence. Adhesive-plaster dressing. V = $\frac{5}{10}$. L: The lens appeared spontaneously after the cystotomy. Adhesive-plaster dressing. On the third day, adhesive iritis and secondary cataract noted; eye not irritable on the twentieth day. Discharged with V = $\frac{5}{200}$.

11. Cat. mat. oc. utr. Male, aged sixty-seven. Ectropion of lower lid of left eye. Double operation, and at the same sitting the ectropion was operated on (Snellen's operation) before the cataract was removed. (Two catgut sutures were used.)

R: The wound (which was mostly in the cornea) was severely bruised during the iridectomy.

L: The incision was very irregular (jagged) because of sudden restlessness of patient. During the iridectomy the patient moved his hand up to the eye; iridectomy irregular, and considerable hemorrhage in the anterior chamber. Notwithstanding five attempts with the hard-rubber spoon, a totally dark pupil cannot be obtained. Boracic-acid dressing. Normal convalescence. Discharged on fifteenth day, with V = $\frac{1}{4}$, both eyes cat. secd.

12. Cat. dur. mat. oc. utr. Female, aged sixty-two. Double operation.

L: After the iridectomy an attempt was made to remove lens and capsule together. Did not succeed. Cystotomy and pressure on lid.

R: Used Graefe's spoon to remove lens without capsule. Adhesive-plaster dressing. Normal convalescence. On the tenth day no irritation. Left eye V = $\frac{5}{10}$, right eye $\frac{5}{30}$.

13. Cat. mat. oc. utr. Female, aged seventy-four. Distichiasis of both eyes (operated on before). Double operation.

R: Normal operation with Graefe's knife. Removal of lens attempted by spoon pressure sliding, but was only successful after considerable trouble, as the sphincter of the iris was intact. This was excised later. Considerable hemorrhage into the anterior chamber.

L: Outward section through scleral border. Lens not removable by pressure with spoon. Wound enlarged with angular scissors, and the lens removed with Pagenstecher's spoon. Afterward considerable cortical matter was removed. Adhesive-plaster dressing. Plastic iritis on both sides, accompanied with considerable pain. On the eighteenth day no irritation. V = $\frac{1}{3}$ in both eyes.

14. Cat. semidur. mat. oc. sinist. Female, aged fifty-seven.

Has always been myopic in both eyes (R : cat. inc. M = 4 D). Operated on immediately after admission. After the knife entered, the iris was wounded. Immediately after the cystotomy there was an evacuation of considerable soft cortical substance. Small nucleus. The remaining cortical substance was removed by pressure and Daviel's spoon. Adhesive-plaster dressing. On the sixth day the whole pupil darkened by secondary cataract. Five weeks after first operation V = > $\frac{1}{3}$. Iridectomy outward. An attempt to remove the secondary cataract with Fischer's forceps was unsuccessful. It was then seized with the iris hook and torn. Dark opening made. Discharged with V = $\frac{8}{10}$. V the same two years later.

15. Cat. semidur. mat. oc. dext. Female, aged fifty-two. Has always been myopic. Cat. inc. oc. sinist. M = $3\frac{1}{2}$ D. The apex of the incision is very steep. Two cystotomies were done. Extraction of lens is difficult, but it is finally fairly expelled by pressure on the lower lid. The remaining cortical débris was removed with the spoon. Adhesive-plaster dressing. During the first night there was severe pain. Partial adhesive iritis. Discharged on twenty-third day with V = $\frac{2}{3}$. One year later V = $\frac{1}{3}$.

16. Cat. hypermat. oc. utr. Female, aged sixty-five ; very decrepit, with wrinkled skin. Considerable hemorrhage in the chamber. Removal of the thickened capsule with fine forceps is attempted, but is not successful. After two attempts to remove the cataract with Pagenstecher's spoon it was found that the nucleus had slipped under the upper lid. The patellar fossa was opened with a sickle-shaped curved cystotome ; slight loss of vitreous. Boracic-acid dressing.

Chemosis of the upper eyelid.

Six days after operation, bulb has collapsed. Sclera is in folds ; returned to normal condition in the next few days. Fourteen days later, after the other cataract had been removed, there was a second collapse. Discharged on the thirty-second day. The thickened capsule has become adherent to the iris all around. V = $\frac{1}{30}$.

Operation on the second eye normal (Graefe's section, normal operation). Iris has adhered to the wound, forming a small cyst. V = $\frac{1}{10}$.

17. Cat. hypermat. Male, aged forty-four. Robust constitution. Comes out of the narcosis while section is being made. The place of counter-puncture can only be rediscovered by dissecting

the conjunctiva. The operation was further complicated by instrumental procedures in removing the lens. Adhesive-plaster dressing.

Normal convalescence, except slight asthmatic troubles on the third day. Discharged on the fourteenth day. V = $\frac{1}{6}$, and later on $\frac{1}{3}$.

18. Cat. zonular. oc. utr. Female, aged twenty-nine. Course of operation was normal. Boracic-acid dressing. Both arms of the coloboma adhered to the wound. V = $\frac{3}{6}$. Discharged on the twenty-ninth day.

19. Cat. mat. (nephritic). Male, aged thirty-eight. The conjunctival flap was irregular and jagged. Boracic-acid dressing. Marginal keratitis. Otherwise normal convalescence. V = $\frac{1}{6}$. Discharged on the fifteenth day.

20. Cat. moll. oc. sin. Female, aged thirty-six. Distichiasis of left eye. Immediately after excision of the iris, the soft lens-matter is evacuated into the anterior chamber; except this, the course of operation was normal. Adhesive-plaster dressing. Plastic iritis, with secondary membranous cataract. On the twentieth day after operation there was discision per corneam. Discharged on the thirtieth day with V = $\frac{1}{6}$.

The **course of healing** was as follows:—

| Course of Healing. | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{300}$ | $\frac{1}{\infty}$ | 0 |
| Normal . . . | 48,7% | 83,8% | 9,5% | 2,4% | 1,8% | 2,4% | — |
| | 451 (21) | 378 (21) | 43 | 11 | 8 | 11 | — |
| Disturbed . . | 51,3% | 61,05% | 11,8% | 5,05% | 2,3% | 11,6% | 8,2% |
| | 475 (36) | 290 (14) | 56 (6) | 24 | 11 (3) | 55 (8) | 39 (5) |

CASES.

1. Cat. mollis. Male, aged twenty-four. Conjunct. cat. Repeated cystotomy, the lens being removed piecemeal; slight loss of vitreous; some of the cortical portion remains. During the first few days some vitreous presents in the wound, and later on there is some iritic irritation and secondary cataract. Adhesive-plaster dressing. Discharged on the eleventh day. V = $\frac{1}{6}\frac{0}{0}$.

2. Cat. polar. post. oc. dex. Catarrhal conjunctivitis. Male, aged fifty-seven. During the cystotomy, the fossa patellaris bursts, and one third of the vitreous is discharged; the nucleus is removed with the metal spoon; during the first few days the

hernia-like protrusion of the vitreous keeps the wound open, and at the same time causes the folded flap to bend at an angle.

Slight incarceration of the iris and secondary cat. $V = \frac{1}{60}$. Two months later, $V = \frac{1}{8}$. Adhesive-plaster dressing. Discharged on twenty-fifth day.

The relations of the course of healing to the visual results will be seen in the following specified table :—

| Complications of the Course of Healing. | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{30}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 |
| | 3,8% | 44,4% | 22,2% | 27,8% | 5,6% | — | — |
| 1. Tardy closure . | 18 | 8 | 4 | 5 | 1 | — | — |
| 2. After hem. in ant. | 2,7% | 84,6% | 15,4% | — | — | — | — |
| chamber . . | 13 (2) | 11 (2) | 2 | — | — | — | — |
| | 2,5% | 75,0% | 16,7% | — | — | 8,3% | — |
| 3. Cystoid scar . | 12 | 9 | 2 | — | — | 1 | — |
| | | | | | — | | — |
| 4. Incarceration of | 10,7% | 86,3% | 11,8% | — | | 1,9% | |
| iris . . . | 51 (1) | 44 (1) | 6 | — | — | 1 | — |
| 5. Incarceration of iris | 1,05% | — | 60,0% | — | — | 40,0% | — |
| with cat. secd. | 5 | — | 3 | | | 2 | — |
| | 20,6% | 85,7% | 14,3% | — | — | — | — |
| 6. Iris-irritation . | 98 (3) | 84 (3) | 14 | — | — | — | — |
| | 7,6% | 66,7% | 22,2% | 5,55% | 5,55% | — | — |
| 7. Irit. pl. adh. part. | 36 (2) | 24 (1) | 8 (1) | 2 | 2 | — | — |
| 8. " " " c. cat. | 23,6% | 59,8% | 6,3% | 8,9% | 4,5% | 20,5% | — |
| sec. . . . | 112 (11) | 67 (2) | 7 (3) | 10 | 5 (1) | 23 (5) | — |
| | 5,05% | 29,2% | 16,7% | 20,8% | 8,3% | 20,8% | 4,2% |
| 9. Iridocapsulitis . | 24 (5) | 7 (1) | 4 (2) | 5 | 2 (2) | 5 | 1 |
| | 1,9% | 77,8% | 11,1% | 11,1% | | | |
| 10. Iridocyclitis serosa | 9 (2) | 7 (2) | 1 | 1 | — | — | — |
| | | | | | — | — | — |
| 11. Iridocyclit. with | 6,5% | — | 3,23% | — | 3,23% | 54,84% | 38,7% |
| occl. of pupil | 31 (6) | — | 1 | — | 1 | 17 (2) | 12 (4) |
| 12. Swelling of rem- | 0,8% | 25,0% | — | — | — | 75,0% | — |
| nants of lens. | 4 | 1 | — | — | — | 3 | — |
| 13. Swelling with after- | 3,6% | 64,7% | 17,6% | 5,9% | — | 11,8% | — |
| hem. in ant. ch. | 17 (1) | 11 | 3 | 1 | — | 2 (1) | — |
| | 3,6% | 94,1% | 5,9% | — | — | — | — |
| 14. Marginal keratitis. | 17 (2) | 16 (2) | 1 | — | — | — | — |
| | 1,9% | — | — | — | — | 11,1% | 88,9% |
| 15. Keratitis purul. | 9 | — | — | — | — | 1 | 8 |
| | 3,8% | — | — | — | — | — | 100,0% |
| 16. Panophthalmia . | 18 (1) | — | — | — | — | — | 18 (1) |
| | 0,2% | 100,0% | — | — | — | — | — |
| 17. Delirium . . . | 1 | 1 | — | — | — | — | — |

3. Cat. hypermat. oc. dext.; glaucomat. chron. oc. sin. Male aged seventy-eight.

Iridectomy on the left eye for the glaucoma; and, on the

right, an extraction, which was done with Graefe's knife. Normal course. It was necessary to remove the lens with a spoon (Pagenstecher's), during which manœuvre a small quantity of vitreous was lost. Adhesive-plaster dressing.

Up to the sixth day convalescence was normal, but on the seventh the wound partly opened, this being caused by the patient getting up suddenly. Hernia of the vitreous. After this, convalescence was normal. Discharged on the twenty-fourth day. Vision $\frac{5}{200}$.

4. Cat. moll. oc. dext. Female, aged thirty-eight. Normal operation. Adhesive-plaster dressing. On the fifth day, the patient's eye came in contact with a chair, causing considerable iritic irritation, which disappeared in a few days. Discharged on the fifteenth day. $V = \frac{5}{20}$.

5. Cat. mat. oc. sinist. Female, fifty-four years of age, apparently healthy. Normal operation. Adhesive-plaster dressing. On the third day, there was considerable purulent keratitis. Discharged on the thirtieth day with $V = 0$.

6. Cat. semidur. mat. Robust male, aged fifty-seven. Normal operation. Boracic-acid dressing. Purulent keratitis; followed by phthisis of bulb. $V = 0$.

7. Cat. semidur. mat. oc. utr. Decrepit female, aged sixty-nine. Eyes deeply set; medium amount of conjunctivitis. Double operation. R: normal operation; boracic-acid dressing and normal convalescence. $V = \frac{1}{3}$. Left eye: cystotomy twice. Cornea collapses in funnel shape; for this reason the remaining cortical portions were not removed. Boracic-acid dressing. On the second day there was purulent keratitis, followed by phthisis of bulb. $V = 0$.

8. Cat. semidur. mat. oc. sin. Healthy woman, aged sixty. Operation was normal, except the last part (removing the cortex). During this, the fossa patell. projects like a hernia, causing further manipulation to be suspended. Boracic-acid dressing. On the second day, purulent keratitis, followed by phthisis of bulb. $V = 0$.

9. Cat. mat. oc. dext. Apparently healthy male, aged eighty-three. Shallow anterior chamber. During the incision, the iris was incised twice; remaining cortex removed with spoon. Adhesive-plaster dressing. On the third day purulent keratitis appeared. Discharged on the twenty-fifth day. $V = 0$.

10. Cat. mat. oc. sin., adherent leucoma; cat. accret. oc.

dext. Healthy male, aged sixty-one. Right: after removal of lens there was considerable loss of vitreous. Antisepsis after Graefe's method. Purulent infiltration of vitreous humor, followed by phthisis of the bulb. Left: eighteen days after the first operation, a preliminary iridectomy upward was made; twenty-five days later, the principal operation. Removal of lens rendered difficult by too small a section. After enlarging the wound with angular scissors the lens was easily removed, and some cortical material pressed out. Antisepsis according to Graefe. Normal convalescence. On the tenth day no irritation. V = $\frac{1}{3}$.

11. Cat. semidur. mat. oc. utr. Healthy female, aged fifty-nine. Somewhat narrow palpebral fissure. Double operation upward with Graefe's knife.

L E: normal operation and normal convalescence; V = $\frac{5}{20}$. R E: restlessness of the patient rendered the iridectomy troublesome. Lens removed by pressure from below. Some of the cortex remained. Adhesive-plaster dressing. Purulent infiltration of the edges of wound, which involved the cornea, causing phthisis of the bulb. V = 0.

12. Cat. mat. oc. sin. Male, aged sixty-three. Blepharophimosis; good constitution. While making the incision, the conjunctiva of the lid is wounded. Adhesive-plaster dressing; purulent infiltration of wound; panophthalmia. V = 0. Discharged on the twenty-fifth day.

13. Cat. mat. oc. sin. Male, aged seventy-four. Normal operation. Adhesive-plaster dressing; purulent infiltration of wound; panophthalmia. V = 0. Discharged on fiftieth day.

14. Cat. mat. oc. sin. Female, aged seventy-three.

Cat. mat. oc. dext. General health good. Corneal incision was made; during the iridectomy the cornea was bruised; remains of lens are left *in situ*. Boracic-acid dressing; purulent infiltration of wound; circular abscess of cornea; phthisis of bulb. V = 0. Discharged on thirty-third day.

15. Cat. mat. oc. sin. Male, aged sixty-eight. Incision and iridectomy rendered very difficult by shallowness of anterior chamber, the upper lid being repeatedly wounded. Adhesive plaster-dressing. Purulent infiltration of wound. Panophthalmia. V = 0. Discharged on the thirty-fifth day.

16. Cat. mat. Male, aged seventy-one, of decrepit appearance. Purulent infiltration of wound. Panophthalmia. V = 0. After the eleventh day, was moving about.

17. Cat. mat. oc. sin. Male, aged sixty-six. General health good. During the cystotomy the zonula was torn; luxation of the cataract and prolapse of the vitreous humor. Purulent iritis; panophthalmia. V = o. Discharged on the twenty-sixth day.

18. Cat. mat. oc. sin. Male, aged sixty-five. General health good. Normal operation. Boracic-acid dressing. Purulent infiltration of the vitreous. Panophthalmia. V = o. Discharged on the twenty-fourth day.

19. Cat. mat. oc. sin. Female, aged sixty-seven. General health good. A small piece of iris dropping in front of the knife was cut off; slight hemorrhage. Boracic-acid dressing. Panophthalmia. V = o. Discharged on the fortieth day.

20. Cat. semidur. mat. oc. dext. Healthy male, aged sixty. Ordinary operation. Boracic-acid dressing. Purulent iritis on the third day. Discharged on the fifteenth day with V = o.

21. Cat. supermat. oc. sin. Male, aged sixty-nine. Robust figure. Severe hemorrhage from iris. Attempt to remove cataract with capsule fails. Adhesive-plaster dressing. On the evening of the second day there is slight delirium; no pain; delirium has disappeared on the fifth day; normal convalescence. V = $\frac{1}{4}$. Discharged on the fifteenth day.

Attempts have been made to ascertain the influence of the various methods of dressing the wounds on the period of convalescence, but they have not been very successful.

To be of value, only those cases should be collected in which the cataract was uncomplicated, and the operation and convalescence were normal. The number of such cases (see table below) is so small that no conclusions can be made.

| Method of Dressing. | No. | Duration of Healing Process. | | |
|---|---|---|---|---|
| | | 10 | 15 | 20 |
| Adhesive plaster . . . | 183 | 45,9%<br>84 | 39,9%<br>73 | 14,2%<br>26 |
| Borated lint . . . . | 31 | 80,6%<br>25 | 12,9%<br>4 | 6,5%<br>2 |
| Salicylated jute . . . | 13 | 23,1%<br>3 | 38,45%<br>5 | 38,45%<br>5 |
| Full Lister dressing . . | 15 | 86,7%<br>13 | 13,3%<br>2 | —<br>— |
| Alf. Græfe's dressing . | 2 | 50,0%<br>1 | 50,0%<br>1 | —<br>— |
| Roller bandage . . . | 3 | —<br>— | 33,3%<br>1 | 66,7%<br>2 |

The numerical results attained by us, in our attempt at finding the relations of the after-treatment and method of dressing on the one side and the result of the operation (as regards union of the wound and vision attained) on the other, have not led to any useful facts, because of the great difference in the number of cases treated by each method. (Adhesive-plaster dressing, 328; boracic-acid dressing, 57, etc.) It is not necessary to remark that this table only includes the cases in which the operation was uncomplicated.

| Dressing. | No. | Visual Results. | | | | | | Course of Healing. | |
|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{60}$ | $-\frac{1}{100}$ | $\frac{1}{\infty}$ | 0 | good. | dis-turb'd |
| | — | 78,1% | 10,4% | 2,4% | 1,8% | 6,1% | 1,2% | 55,5% | 44,5% |
| Adh. plast. . . . | 328 | 256 | 34 | 8 | 6 | 20 | 4 | 182 | 146 |
| | — | 77,2% | 12,3% | 3,5% | — | 1,75% | 5,25% | 54,4% | 45,6% |
| Bor. lint. . . . | 57 | 44 | 7 | 2 | — | 1 | 3 | 31 | 26 |
| | — | 70,4% | 14,8% | 7,4% | 7,4% | — | — | 48,1% | 51,9% |
| Salicylated-jute . . | 27 | 19 | 4 | 2 | 2 | — | — | 13 | 14 |
| | — | 93,75% | — | — | — | 6,25% | — | 93,8% | 6,2% |
| Lister's antisepsis . . | 16 | 15 | — | — | — | 1 | — | 15 | 1 |
| | — | 62,5% | — | — | — | 25% | 12,5% | 37,5% | 62,5% |
| Roller . . . . . | 8 | 5 | — | — | — | 2 | 1 | 3 | 5 |
| | — | 100% | — | — | — | — | — | 66,7% | 33,3% |
| Alfr. Graefe's antisepsis . | 3 | 3 | — | — | — | — | — | 2 | 1 |

We have already made some observations regarding double operations at one sitting. The large number of such cases justifies us in tabulating them; see following page.

We have also described the various anomalies observed on eyes which are operated on. But as these are all complications which in themselves do not render the operation more difficult, we have only brought them in relation to the course of convalescence and the visual results (and to these only in two great categories). Such a compilation, moreover, could be considered as proof in one direction or the other, only if we also take into consideration the variety of cataract, the course of the operation, and perhaps also the after-treatment. The final results can hardly be said to be influenced by any of the complicating factors, excepting, perhaps, dacryocystoblennorrhœa, catarrhal conjunctivitis, and perhaps myopia.

| Operation in one Sitting. | No. | Visual Results. | | | | | | Operation. | | Course of Healing. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{60}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | o | n. | c. | n. | dis-turbed. |
| | 58,4% | 73,9% | 10,9% | 2,95% | 1,84% | 5,54% | 4,98% | 46,2% | 53,8% | 47,7% | 52,3% |
| Single . . | 541 (42) | 400 (28) | 58 (3) | 16 | 10 (2) | 30 (8) | 27 (1) | 250 (10) | 291 (32) | 258 (17) | 283 (25) |
| | 41,6% | 69,6% | 10,6% | 4,9% | 2,3% | 9,4% | 3,1% | 46,2% | 53,8% | 47,8% | 52,2% |
| Double . . | 385 (15) | 268 (7) | 41 (3) | 19 | 9 (1) | 36 | 12 (4) | 178 (4) | 207 (11) | 184 (4) | 201 (11) |

| Method of Second Operation. | No. | Operation. | | Healing | | Meth. of 1st Oper. | No. | Operation. | | Healing. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n. | c. | n. | dist. | | | n. | c. | n. | dis-turbed. |
| Upward extr. with Graefe's knife | 164 | 104 | 60 | 91 | 73 | Upward extraction with Græfe's knife. | 164 (13) | 55 (3) | 109 (10) | 71 (3) | 93 (10) |
| Downw. " " " " | 8 | 3 | 5 | 6 | 2 | | 8 | — | 8 | 5 | 3 |
| " " " Rothm.'s " | 21 | 8 | 13 | 12 | 9 | | 21 (1) | 11 | 10 (1) | 10 | 11 (1) |
| " " " Beer's " | 12 | 8 | 4 | 6 | 6 | | 12 | 5 | 7 | 3 | 9 |
| " " " Kapsel . | 3 | 2 | 1 | 2 | 1 | | 3 | 1 | 2 | 1 | 2 |
| " " " s. Liebreich | 4 | 3 | 1 | 3 | 1 | | 4 (1) | 1 (1) | 3 | 1 (1) | 3 |
| " " " " Weber . | 4 | 3 | 1 | 2 | 2 | | 4 | — | 4 | — | 4 |
| " " " " Wecker . | 2 | 2 | — | — | 2 | | 2 | — | 2 | 1 | 1 |
| " " " " Mooren . | 1 | 1 | — | — | 1 | | 1 | 1 | — | 1 | — |
| " " " " Jäger . | 1 | — | 1 | — | 1 | | 1 | — | 1 | — | 1 |
| " " " " Critchett | 1 | — | 1 | — | 1 | | 1 | — | 1 | — | 1 |

| Complications. | No. | Healing. | | Results. | |
|---|---|---|---|---|---|
| | | good. | dis-turb'd | good. | bad. |
| Blepharo-phimosis . . . . . | 3 (1) | — | 3 (1) | 3 (1) | — |
| Distichiasis . . . . . | 1 | 1 | — | 1 | — |
| Dacryocystoblennorrhœa . . . | 8 | 1 | 7 | 8 | — |
| Conjunct. cat. chr. . . . . | 145 (6) | 71 (5) | 74 (1) | 133 (6) | 12 |
| Pterygium . . . . . | 7 | 4 | 3 | 7 | — |
| Mac. corn. . . . . | 4 (1) | 3 | 1 (1) | 4 (1) | — |
| Leucom. adh. . . . . | 1 (1) | — | 1 (1) | — | 1 (1) |
| Marked myopia . . . . . | 1 (1) | — | 1 (1) | 1 (1) | — |
| Strabism. conv. . . . . | 1 | — | 1 | 1 | — |
| Strabism. diverg. . . . . | 1 | — | 1 | 1 | — |
| Phthisis of the other eye . . . | 2 (1) | — | 2 (1) | 2 (1) | — |
| Total . . | 174 (11) | 80 (5) | 94 (6) | 161 (10) | 13 (1) |

CASES.

1. Cat. mat. oc. dext. Male, aged sixty-five. Dacryocystoblennorrhœa of right eye. One month before the extraction of the cataract, the Bowman-Weber operation was done. In the right eye it was necessary to enlarge the incision with the angular scissors before the lens could be removed; the cortical remains were

not entirely removed because of the great danger of loss of vitreous. The fossa patell. appeared in the wound. Dressing of salicylated jute.

On the third day after the operation, the hernia of the vitreous humor was removed. Wound was closed on the twelfth day. On the fifteenth day there was a sudden discharge of purulent matter from the tear-duct. Discharged on the twenty-fourth day with V = $\frac{6}{100}$. Secondary cataract.

Two months after the extraction, iridectomy as a secondary operation. The secondary cataract was nearly totally removed with a spoon. V = $\frac{1}{10}$.

2. Cat. semidur. mat. oc. sin. Female, aged fifty-nine. Normal operation. Boracic-acid dressing. Normal convalescence. On the ninth day a slight degree of dacryocystoblennorrhœa of this eye was noted, but no other trouble was experienced. Discharged on the twenty-fifth day (the Weber-Bowman operation being done first) with V = $\frac{1}{2}$.

3. Cat. mat. oc. dext. Female, aged sixty. Dacryocystoblennorrhœa. The use of the elevators causes thick pus to come from both lachrymal ducts. Normal operation. Normal convalescence. V = $\frac{1}{2}$. Roller bandage. Discharged on the fourteenth day after operation.

In seventy-two (7.8 % of the whole number) cases, a cataract extraction had been done on the fellow eye some time previously. In the eyes operated on first there were sixty-two successes (86.2 %) and ten failures (13.8 %), while in those operated on later there were sixty-seven successes (93.05 %) and five failures (6.95 %).

In two hundred and forty-three cases (26.2 %) we were able to ascertain how much the vision, attained directly by the operation, had improved without a secondary operation.

In 95.1 % of these cases (two hundred and thirty-one) V improved considerably; in twelve cases (4.9 %) it was found that central vision became worse. In one case this was caused by occlusion of the pupil coming on four months after operation. In another case it was caused by great myopia resulting in degeneration of the macula. In five, cases it was caused by secondary cataract. In the remaining five cases no cause for the diminished vision could be

found. The results attained by secondary operations are as follows:

I.—Operation for simple secondary cat. in twenty-five cases:

1. Discision through the cornea with good result, ten cases (four times one month after primary operation, three times two months, and three times three months later).

2. Discision through the sclera, twelve times with good results (seven times one month, three times two months, and twice three months after the primary operation).

3. Iridectomy three times with good results (one, two, and three months after operation).

4. One reclination with good result (one month).

II. Secondary operation was caused twenty-seven times by cat. sec. accreta:

1. Twelve times discision per scleram with good results (one after one month, four after two months, seven after three months).

2. Iridectomy; three with good and one with unsatisfactory results (one after two months, three after three months).

3. One iridectomy with discision and one with extraction of the capsule; good results (both cases two months after operation).

4. Nine iridectomies; nine good results, (six cases operated on two months and three three months after the primary operation).

### II.—Upward Extraction with v. Rothmund's Knife.

In a small number of cases (thirty-eight altogether), Prof. v. Rothmund used a knife which, on the whole, has the wedge-shaped blade peculiar to the keratome of Richter-Beer, but is somewhat narrower. In regard to its width, it is somewhat between the greatest width of Beer's knife and that of Graefe's. In using this modified knife, the vertical width of the flap is, of course, greater, being practically the same result as that attained in using a knife as made by Beer. But as a sawing movement is impossible, one is hardly ever able to make a useful flap of conjunctiva. In the years 1870 and 1871 it was frequently used in upward

extractions; afterward, but seldom, and not at all in the last seven years. But in extractions made through the lower corneo-scleral margin, it has been used of late in numerous cases. The remainder of the operation is similar to that in which Graefe's knife is used.

In the thirty-eight cases referred to, vision attained was: $V = \frac{1}{10}$ in twenty-nine cases; $\frac{1}{30}$ in two cases; $\frac{1}{60}$ in two cases. $\frac{1}{\infty}$ in one case, and total failure in one case; and in three cases $V = \frac{1}{\infty}$ with chances of success. Secondary cataracts are noted in five cases (expressed in percentages: 76.3; 5.3; 2.6; 7.9; 13.1).

The various results may be seen in the following table:

I.—INFLUENCE OF AGE ON THE VISUAL RESULTS.

| Age. | Number. | Visual Results. | | | | | $\frac{1}{\infty}$ hopeless or 0 |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{100}$ | $\frac{1}{\infty}$ | |
| | 5,3% | 50% | — | — | — | 50% | — |
| 30—40 . | 2 | 1 | — | — | — | 1 | — |
| | 13,1% | 80% | — | 20% | — | — | — |
| 40—50 . | 5 | 4 | — | 1 | — | — | — |
| | 21,1% | 87,5% | — | 12,5% | — | — | — |
| 50—60 . | 8 | 7 | — | 1 | — | — | — |
| | 47,4% | 77,8% | 11,1% | — | — | 5,6% | 5,6% |
| 60—70 . | 18 | 14 | 2 | — | — | 1 | 1 |
| | 13,1% | 60% | — | — | 20% | 20% | — |
| 70—80 . | 5 | 3 | — | — | 1 | 1 | — |

II.—INFLUENCE OF THE CHARACTER OF THE CATARACT.

| Character of Cataract | No. | Visual Results. | | | | | | Operation. | | Loss of vitr. | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{100}$ | $\frac{1}{\infty}$ | 0 | norm. | dist. | | good. | dist. |
| | 76,3% | 79,3% | 3,45% | 6,9% | 3,45% | 6,9% | — | 13,8% | 86,2% | 13,8% | 58,6% | 41,4% |
| C. matura . | 29 | 23 | 1 | 2 | 1 | 2 | — | 4 | 25 | 4 | 17 | 12 |
| | 7,9% | 80% | — | — | — | 20% | — | 20% | 80% | — | 80% | 20% |
| C. maturesc. | 5 | 4 | — | — | — | 1 | — | 1 | 4 | — | 4 | 1 |
| | 7,9% | 33,3% | 33,3% | — | — | — | 33,3% | 33,3% | 66,7% | — | 66,7% | 33,3% |
| C. hyperm. . | 3 | 1 | 1 | — | — | — | 1 | 1 | 2 | — | 2 | 1 |
| | 2,6% | 100% | — | — | — | — | — | — | 100% | — | 100% | — |
| Cat. mollis . | 1 | 1 | — | — | — | — | — | — | 1 | — | 1 | — |

### III.—INFLUENCE OF THE COURSE OF THE OPERATION IN GENERAL.

| Operation. | No. | Visual Results. | | | | | | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 | good. | dist. |
| | 15,8% | 50% | — | 16,7% | — | 33,3% | — | 50% | 50% |
| 1. Uncomplicated | 6 | 3 | — | 1 | — | 2 | — | 3 | 3 |
| | 84,2% | 81,3% | 6,3% | 3,1% | 3,1% | 3,1% | 3,1% | 65,6% | 34,4% |
| 2. Complicated | 32 | 26 | 2 | 1 | 1 | 1 | 1 | 21 | 11 |

| Complications. | No. | Visual Results. | | | | | | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 | good. | dist. |
| Copious hemorrhage in | 6,25% | 100% | — | — | — | — | — | 50% | 50% |
| anterior chamber . . . | 2 | 2 | — | — | — | — | — | 1 | 1 |
| | 3,1% | 100% | — | — | — | — | — | 100% | — |
| Laborious expuls. of lens | 1 | 1 | — | — | — | — | — | 1 | — |
| Laborious expuls. of lens | 3,1% | 100% | — | — | — | — | — | 100% | — |
| with complications . . | 1 | 1 | — | — | — | — | — | 1 | — |
| Loss of vitreous and intro- | 6,25% | 100% | — | — | — | — | — | 50% | 50% |
| duction of instruments | 2 | 2 | — | — | — | — | — | 1 | 1 |
| Loss of vitr. and intr. of | 6,25% | 100% | — | — | — | — | — | 50% | 50% |
| inst. with remn. of lens | 2 | 2 | — | — | — | — | — | 1 | 1 |
| Introduction of instru- | 68,8% | 72,7% | 9,1% | 4,5% | 4,5% | 4,5% | 4,5% | 63,6% | 36,4% |
| ments in ant. ch. . . . | 22 | 16 | 2 | 1 | 1 | 1 | 1 | 14 | 8 |
| Intr. of inst. in ant. ch. | 6,25% | 100% | — | — | — | — | — | 100% | — |
| with complications . . | 2 | 2 | — | — | — | — | — | 2 | — |

### IV.—INFLUENCE OF THE COURSE OF HEALING IN GENERAL.

| Course of Healing. | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 |
| | 63,2% | 87,5% | 8,33% | — | — | 4,16% | — |
| Normal . . . | 24 | 21 | 2 | — | — | 1 | — |
| | 36,8% | 57,14 | — | 14,3% | 7,14% | 14,3% | 7,14% |
| Disturbed . . | 14 | 8 | — | 2 | 1 | 2 | 1 |

| Complications in the Course of Healing. | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 |
| | 28,6% | 100% | — | — | — | — | — |
| 1. Iritic irritation . . . . | 4 | 4 | — | — | — | — | — |
| | 7,1% | 100% | — | — | — | — | — |
| 2. Irit. plast. adhæs. part. . | 1 | 1 | — | — | — | — | — |
| | 7,14% | — | — | 100% | — | — | — |
| 3. Irit. plast. cum cat. sec. . | 1 | — | — | 1 | — | — | — |
| | 21,4% | 33,3% | — | 33,3% | 33,3% | — | — |
| 4. Iridocapsulitis . . . . . | 3 | 1 | — | 1 | 1 | — | — |
| | 14,3% | 100% | — | — | — | — | — |
| 5. Iridocyclit. serosa . . . | 2 | 2 | — | — | — | — | — |
| 6. Iridocyclit. ending in oc- | 7,14% | — | — | — | — | 100% | — |
| clus. pup. . . . . | 1 | — | — | — | — | 1 | — |
| | 7,14% | — | — | — | — | — | 100% |
| 7. Panophthalmia . . . . | 1 | — | — | — | — | — | 1 |
| 8. Catar. secd. et irritat. glau- | 7,14% | — | — | — | — | 100% | — |
| comatos. . . . . | 1 | — | — | — | — | 1 | — |

CASES.

Cat. mat. o. d. A woman, sixty-five years of age, very stupid. Leucoma adherens; aphakia ex operatione oc. sin. V = $\frac{1}{\infty}$. Conj. cat. chron. Expulsion of lens laborious, on account of narrowness of anterior chamber. Salicylated jute. Intense scleral injection. The patient always tears the bandage off, so that only cold applications and atropia could be administered. On the first day after the operation the whole pupil covered with blood, and secondary cataract. On the fourteenth day: opacity of cornea and interior ciliary injection, and neurosis, with great increase of tension. The glaucomatous attack three days later repeated. On the twenty-fifth day after the operation, iridectomy. Recovery with a few irritative symptoms. V = $\frac{1}{\infty}$. Cat. sec. Even two secondary operations—iridectomy in second and fourth months after the operation—without any telling result. Pupil upward and downward obstructed by cataracta secundaria and coagulations of blood. V = $\frac{1}{200}$.

The table, illustrating the duration of healing in uncomplicated cataract, operation, and healing, admits of no comparison, as there were only three cases in which occlusion by means of adhesive plaster was made use of (2 recoveries after fifteen days, 1 after twenty days [60, 66 % and 33, 33 %]). The same has to be said about the influence of the method of bandaging in after-treatment upon the recovery and the visual result in uncomplicated operations. Of all those numbers only six are useful, in which the after-treatment was the same as in the cases just mentioned (in 3 V = $-\frac{1}{10}$; in 1 V = $-\frac{1}{60}$; in the remaining 2 V = $\frac{1}{\infty}$; recovery three times good, three times disturbed).

Twenty-one operations were single (17 = $-\frac{1}{10}$; 2 = $-\frac{1}{60}$; each 1 = $-\frac{1}{200}$ and $\frac{1}{\infty}$. Three times normal course of operation, eighteen times complicated. Recovery: thirteen times good, five times disturbed).

The remainder (17) refers to double operations, as follows:

1. In seven cases double extraction upward with R.'s knife. (In the eye first operated upon: one normal operation, six complicated; six good recoveries, one disturbed. In the second: one normal and six disturbed operations; three times good and four times complicated recovery.)

2. Three times a corneal-flap extraction was performed on the other eye (one normal operation, two complicated operations; two good recoveries, one disturbed, in the eye operated upon according to Beer. In the eye operated upon according to Rothmund: operation in all three cases complicated; recovery twice).

Conjunctivitis catarrhalis was the only complication, and this happened eleven times. Ten times (90, 9 % the recovery was good, once (9, 1 %) it was disturbed. Eight times (72, 7 %) the visual result was good, three times (27, 3 %) bad.

In two cases (5, 3 %) operated upon with good result, the extraction was previously performed on the other eye with the same favorable result. In eleven cases (28, 9 %) of which the sight was examined once more, it had improved nine times (87, 8 %), two times (18, 2 %) it was impaired (in consequence of condensation of secondary cataract). In simple secondary cataract, giving five times occasion to a secondary operation, always a good result was obtained; the same in two (8, 3 %) cases of cataracta secundaria accreta.

The operations were: In simple secd. once (20 %) discisio per scl. (performed one month after the first operation); twice (40 %) iridectomy (after one, resp. two months); once (40 %) iridectomy (after three months), and once reclination (after two months).

In cat. secd. accr. iridotomy was performed once (three months after the first operation); discision through the sclera once (one month after the first operation).

### EXTRACTION DOWNWARD.

In 269 cataracts von Rothmund located the section in the lower scleral junction and performed it 166 times with his own knife, 103 times with v. Graefe's knife. The indications, which v. Rothmund advocates for the extraction downward, are about the same as those which Mooren has pointed out.

1. Quite a large number of cataract-patients, even after a practice of several days, never learn to look downward,—the eye always rolling upward and often remaining for a long time in this abnormal position. In those cases—

mostly stupid and nervous patients—the section in the lower scleral junction was the rule.

2. The operation was performed with great predilection in very prominent or very deep-lying eyes; in the last case especially when there existed a narrowness of the palpebral fissure.

3. Eighteen times a cataracta accreta was operated upon in this manner.

4. Von Rothmund almost always applied this method when the other eye was wanting or amaurotic (no matter whether the form of this globe was preserved or not).

The results will be illustrated by the tables below.

We refer to the remarks we made above, speaking of extraction in regard to the differences of the method, especially in the formation of the section.

### *I.—Extraction with Graefe's Knife.*

The visual result in 103 cataracts, operated upon according to that method, was: $V = -\frac{1}{10}$ sixty-four cases (62, 1 %); $V = -\frac{1}{30}$ and $\frac{1}{\infty}$ in fourteen cases (13, 6 %); three times $V = -\frac{1}{60}$ and $-\frac{1}{300}$ (2, 9 %); five failures (4, 9 %); cataracta secundaria sixteen times (15, 5 %).

I.—INFLUENCE OF AGE.

| Age. | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{40}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 |
| | 1,9% | — | — | 50% | — | 50% | — |
| 20–30 . . . . | 2 | — | — | 1 | — | 1 | — |
| | 2,9% | 66,7% | 33,3% | — | — | — | — |
| 30–40 . . . . | 3 | 2 | 1 | — | — | — | — |
| | 4,9% | 60% | 20% | — | — | 20% | — |
| 40–50 . . . . | 5 | 3 | 1 | — | — | 1 | — |
| | 24,3% | 84% | 8% | — | — | 4% | 4% |
| 50–60 . . . . | 25 | 21 | 2 | — | — | 1 | 1 |
| | 40,8% | 61,9% | 21,43% | 4,76% | — | 9,52% | 2,38% |
| 60–70 . . . . | 42 | 26 | 9 | 2 | — | 4 | 1 |
| | 24,3% | 48% | 4% | — | 12% | 24% | 12% |
| 70–80 . . . . | 25 | 12 | 1 | — | 3 | 6 | 3 |
| | 0,9% | — | — | — | — | 100% | — |
| 80–90 . . . . | 1 | — | — | — | — | 1 | — |

II.—INFLUENCE OF CHARACTER OF CATARACT.

| Cataract. | No. | Visual Results. | | | | | | Operation. | | Prolapse of Vitr. | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{50}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 | good. | dist. | | good. | dist. |
| | 70,9% | 67,12% | 12,33% | 2,74% | 1,37% | 9,59% | 6,85% | 46,6% | 53,4% | 10,9% | 50,7% | 49.3% |
| Cat. mat. | 73 | 49 | 9 | 2 | 1 | 7 | 5 | 34 | 39 | 8 | 37 | 36 |
| C. maturesc. . . | 10,7% | 63,6% | 18,2% | — | — | 18,2% | — | 54,5% | 45.5% | 18,2% | 45,5% | 54.4% |
| | 11 | 7 | 2 | — | — | 2 | — | 6 | 5 | 2 | 5 | 6 |
| C. hypermat. . . | 12,6% | 46,2% | 7,7% | 7,7% | 15,4% | 23,2% | — | 23,1% | 76,9% | 30,8% | 61,5% | 38,5% |
| | 13 | 6 | 1 | 1 | 2 | 3 | — | 3 | 10 | 4 | 8 | 5 |
| | 1,9% | 50% | 50% | — | — | — | — | 50% | 50% | 50% | 100% | — |
| C. accreta | 2 | 1 | 1 | — | — | — | — | 1 | 1 | 1 | 2 | — |
| | 2,9% | 33,33% | — | — | — | 66,66% | — | — | 100% | — | — | 100% |
| C. mollis | 3 | 1 | — | — | — | 2 | — | — | 3 | — | — | 3 |
| C. nephritica . . | 0,97% | — | 100% | 100% | — | — | — | — | 100% | — | — | 100% |
| | 1 | — | 1 | — | — | — | — | — | 1 | — | — | 1 |

CASES.

1. Cataracta mollis oc. d. A man twenty-one years of age. The patient was operated upon six months ago for cataracta gypsea of the left eye, per scleram outward (modified Critchett's method). Course of operation and recovery normal. $V = \frac{1}{\infty}$. Cat. sec.

Expulsion of lens in the right eye very slow, requires the introduction of Graefe's spoon. Bandage of salicylated jute. Recovery normal, but a little piece of iris in the wound. Duration of healing, fifteen days. On oblique illumination any quantity of retiform opacities of the vitreous and a small cat. sec. noticeable. The ophthalmoscope reveals detachment of the retina upward and inward. $V = \frac{1}{\infty}$.

2. Cat. mol. zonul. o. s. (larger objects are recognized yet in immediate proximity ; print not deciphered any more). Cat. moll. zonul. o. d. V = Jäger XX. The man, forty-eight years of age, notices a decrease of his vision from his twenty-first year of age. L. eye operated upon. After the cystotomy the lens does not follow upon pressure. Even after enlarging the scleral section with the blunt-pointed knife the lens is not expelled. It has to be removed in pieces with the double hook and continued pressure on the lower part of the cornea. Black pupil. Adh.-pl. band.

Iridocapsulitis observed on the fourth day ; on the forty-fifth day discharged with $V = \frac{1}{\infty}$. Pupil obstructed by grayish exudation adherent to the iris on two places. Three months later iridectomy outward. On the attempt to remove the exudative mass

by means of Fischer's pair of forceps, pretty great loss of vitreous. Adh.-pl. band. Recovery without irritation. Discharged fifteen days later. Seventh month after the first operation V = $\frac{1}{10}$. Two and a half years later V = $\frac{1}{5}$.

3. Catar. maturescens [accret.] (observed during the operation). Woman, fifty-nine years of age. Operation complicated on account of the instruments. Adh.-pl. band. Recovery disturbed by marginal keratitis and partial necrosis of the conjunctiva. V = $\frac{1}{4}$. Discharged on the fourteenth day.

III.—INFLUENCE OF THE COURSE OF THE OPERATION.

| Operation. | No. | Visual Results. | | | | | | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{60}$ | $-\frac{1}{600}$ | $-\frac{1}{3000}$ | $\frac{1}{\infty}$ | 0 | good. | dist. |
| Uncomplicated | 42,7% | 70,5% | 13,6% | — | 2,3% | 9,1% | 4,5% | 61,4% | 38,6% |
| | 44 | 31 | 6 | — | 1 | 4 | 2 | 27 | 17 |
| Complicated . | 57,3% | 55,9% | 13,6% | 5,1% | 3,4% | 16,9% | 5,1% | 42,4% | 57,6% |
| | 59 | 33 | 8 | 3 | 2 | 10 | 3 | 25 | 34 |

| Complications. | No. | Visual Results. | | | | | | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{60}$ | $-\frac{1}{3000}$ | $\frac{1}{\infty}$ | 0 | good. | dist. |
| | 1,7% | 100% | — | — | — | — | — | 100% | — |
| 1. Compl. iridectomy | 1 | 1 | — | — | — | — | — | 1 | — |
| 2. Laborious expulsion . . . . | 11,9% | 57,2% | 14,3% | 28,6% | — | — | — | 42,9% | 57,1% |
| | 7 | 4 | 1 | 2 | — | — | — | 3 | 4 |
| 3. do. with compl. . | 3,4% | 50% | 50% | — | — | — | — | 50% | 50% |
| | 2 | 1 | 1 | — | — | — | — | 1 | 1 |
| 4. Prolapse of lens . | 3,4% | 50% | — | — | — | — | 50% | 50% | 50% |
| | 2 | 1 | — | — | — | — | 1 | 1 | 1 |
| 5. Remnants of lens | 10,2% | 50% | 50% | — | — | — | — | 83,3% | 16,7% |
| | 6 | 3 | 3 | — | — | — | — | 5 | 1 |
| 6. do. with hemorrh. in ant. ch. . . | 3,4% | 100% | — | — | — | — | — | — | 100% |
| | 2 | 2 | — | — | — | — | — | — | 2 |
| 7. Loss of vitreous . | 3,4% | 50% | — | — | — | 50% | — | — | 100% |
| | 2 | 1 | — | — | — | 1 | — | — | 2 |
| 8. do. with introduction of instruments . . . | 6,8% | 50% | — | — | — | 50% | — | 25% | 75% |
| | 4 | 2 | — | — | — | 2 | — | 1 | 3 |
| 9. do. with remnants of lens . . . | 3,4% | 50% | — | — | 50% | — | — | 50% | 50% |
| | 2 | 1 | — | — | 1 | — | — | 1 | 1 |
| 10. do. with introd. of instr. and remnants . . . | 6,8% | — | — | — | — | 75% | 25% | 25% | 75% |
| | 4 | — | — | — | — | 3 | 1 | 1 | 3 |
| 11. do. with hemorrh. in ant. ch. and introduction of instruments . | 3,4% | 50% | — | — | 50% | — | — | 50% | 50% |
| | 2 | 1 | — | — | 1 | — | — | 1 | 1 |
| 12. Introd. of instr. in ant. ch. . . . | 27,1% | 62,5% | 18,75% | — | — | 12,5% | 6,25% | 43,75% | 56,25% |
| | 16 | 10 | 3 | — | — | 2 | 1 | 7 | 9 |
| 13. do. with compl. . | 15,1% | 66,7% | — | 11,1% | — | 22,2% | — | 33,3% | 66,7% |
| | 9 | 6 | — | 1 | — | 2 | — | 3 | 6 |

CASES.

1. Cat. supermat. o. d. in a healthy woman, aged fifty-one years. Strabismus divergens and conjunctival catarrh. Lens dislocated downward after the iridectomy. The speculum being removed, the lens is expelled *in toto*, without any loss of vitreous, upon gentle pressure with the lid. Some iris remained in the wound. Adhesive-plaster bandage. Iridocyclit. adhæsiv. total, with occlusion of pupil. V = $\frac{1}{\infty}$. Discharged on the twenty-first day.

2. Cat. mat. A man, seventy-three years of age, suffering from arthritis. Patient very restless. Corneal section; a considerable escape of vitreous immediately after the excision of the iris; much cortical substance has to be left behind. Adhesive-plaster band., cat. sec. V = $\frac{1}{200}$. Discharged on the thirty-fifth day.

3. Cat. hypermat. oc. utr. Man, seventy-four years old. Double operation with Graefe's knife. R: instrum. and corp. vitr. L.: lens-matter remains. In both, recovery undisturbed. Adhesive-plaster band. V = $\frac{1}{4}$ oc. utr. Discharged on the tenth day.

4. Cat. congenit. oc. sin. Man forty-seven years of age. Microphthalmus. Nystagmus oc. utr. Lower section with Graefe's knife; iridectomy very laborious. The attempt to extract the apparently dislocated cataract within the capsule fails; after cystotomy easy expulsion of lens. Recovery good, except moderate conjunctival irritation. V = $\frac{1}{10}$. Compression roller. Duration of healing, twelve days.

5. Cat. hypermatur. congenit. (?) oc. utr. Woman, aged thirty years. Nystagmus oc. utr. The preparatory iridectomy was performed on the other eye eight days previous to the extraction. The hard cataract crumbles and has to be extracted in fragments. Adhesive-plaster band. Recovery normal; opacities of the vitreous. V = $\frac{1}{200}$; two months later, $\frac{5}{10}$. Duration of healing, twenty days.

IV.—INFLUENCE OF THE COURSE OF HEALING.

| Healing. | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{3}{10}$ | $-\frac{5}{10}$ | $-\frac{8}{10}$ | $\frac{1}{\infty}$ | 0 |
| | 50,5% | 78,8% | 13,5% | — | 5,8% | 1,9% | — |
| Smooth . . . . | 52 | 41 | 7 | — | 3 | 1 | — |
| | 49,5% | 45,1% | 13,7% | 5,9% | — | 25,5% | 9,8% |
| Disturbed . . . | 51 | 23 | 7 | 3 | — | 13 | 9 |

| Complications of the Healing Process. | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{50}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 |
| | 13,7% | 71,4% | 14,3% | — | — | 14,3% | — |
| 1. Violent conjunctivitis . | 7 | 5 | 1 | — | — | 1 | — |
| 2. Tardy closure (once with | 3,9% | 50% | — | — | — | 50% | — |
| cat. secd.) . . | 2 | 1 | — | — | — | 1 | — |
| | 5,9% | 100% | — | — | — | — | — |
| 3. Cystoid scar . . | 3 | 3 | — | — | — | — | — |
| | 9,8% | 60% | 40% | — | — | — | — |
| 4. Incarceration of iris . | 5 | 3 | 2 | — | — | — | — |
| | 9,8% | 80% | 20% | — | — | — | — |
| 5. Irit. plast. c. cat. sec. | 5 | 4 | 1 | — | — | — | — |
| | 7,8% | 25% | — | 50% | — | 25% | — |
| 6. Iridocapsulitis . . | 4 | 1 | — | 2 | — | 1 | — |
| | 1,95% | 100% | — | — | — | — | — |
| 7. Iridocyclitis serosa . | 1 | 1 | — | — | — | — | — |
| 8. Iridocyclit. adh. tot. | 13,7% | — | — | — | — | 100% | — |
| occlus. pup. . . | 7 | — | — | — | — | 7 | — |
| 9. Swelling of remnants of | 1,95% | — | — | 100% | — | — | — |
| lens . . . | 1 | — | — | 1 | — | — | — |
| 10. Do. with following hem- | | | | | | | |
| orrhage into the ante- | 7,8% | 50% | 25% | — | — | 25% | — |
| rior chamber . . | 4 | 2 | 1 | — | — | 1 | — |
| | 5,9% | 33,3% | 66,7% | — | — | — | — |
| 11. Marginal keratitis . | 3 | 1 | 2 | — | — | — | — |
| 12. Keratit. purul. circum- | 5,9% | 66,7% | — | — | — | 33,3% | — |
| scripta . . . | 3 | 2 | — | — | — | 1 | — |
| | 9,8% | — | — | — | — | — | 100% |
| 13. Panophthalmia . . | 5 | — | — | — | — | — | 5 |
| | 1,95% | — | — | — | — | 100% | — |
| 14. Secessus retin. . . | 1 | — | — | — | — | 1 | — |

CASES.

1. Cat. maturesc. Man, aged fifty-nine years. Conjunctivitis oc. utr. Puncture of vitreous; cortical masses removed by means of the spoon. Adhesive-plaster band. Hernia of vitreous; tardy closure; otherwise good recovery. V = $\frac{1}{4}$. Duration of healing, twenty days.

2. Cat. mat. oc. utr. Man, seventy-five years of age, a very decrepit individual. Globes very deep-seated. Double operation downward according to Graefe. Operation without disturbance in both. Adhesive-plaster band. Purulent infiltration of wound. Keratitis purulenta. Panophthalmia. V = 0 oc. utr. Discharged on the twenty-fourth day.

3. Cat. maturesc. o. d. A man of good general health, aged sixty-four years. Operation performed *lege artis*. After the operation black pupil. Adhesive-plaster band. Iridocyclitis purulenta on the second day. Discharged after twenty-two days with complete obstruction of the pupil by a purulent exudation, besides an hypopyon two millimetres in height. V = $\frac{1}{\infty}$.

4. Cat. matur. Woman, sixty-two years of age; good general health; rapid expulsion of lens after the cystotomy; purulent infiltration of the vitreous; panophthalmia. V = 0. Adhesive-plaster band. Discharged on the twenty-sixth day after the operation.

5. Cat. mat. o. d. Man, sixty-eight years of age. Extraction of lens by means of a sharp spoon. Operation otherwise normal. Graefe's bandage. On the fifth day after the operation the patient leaves the institution and treatment. Five months later he calls again with perfectly regular closure, etc. V = $\frac{1}{4}$.

For the comparison of the different methods of after-treatment, only forty-four cases are fit.

Adhesive-plaster bandage was applied twenty-two times (18 V = $-\frac{1}{10}$, 1 = $-\frac{1}{200}$, and 1 = $\frac{1}{\infty}$, 2 = 0; sixteen times good recovery, six times disturbed). In nine cases, borated-lint occlusion (7 = $-\frac{1}{10}$, 1 = $-\frac{1}{20}$, and 1 = $\frac{1}{\infty}$; course of healing: three normal, six disturbed). The typical Lister's bandage eight times (5 V = $-\frac{1}{10}$, 2 V = $-\frac{1}{20}$, 1 V = $\frac{1}{\infty}$; six good and two disturbed recoveries). Three bandages of salicylated jute (1 = $-\frac{1}{10}$, 2 = $-\frac{1}{20}$; one good and two disturbed recoveries). Two times Graefe's bandage ($-\frac{1}{20}$ $\frac{1}{\infty}$; one normal and one complicated recovery).

The duration of healing (in uncomplicated operation and course of healing) was, in fifteen cases of adhesive-plaster bandage: six times, ten days; seven times, fifteen; and twice, twenty and more days. In seven cases of Lister's bandages it was: four times, ten days; three times, fifteen days. Borated-lint occlusion: three cases (twice, ten days; once, fifteen days). One bandage of salicylated jute, fifteen days. One Graefe's bandage, ten days.

V.—INFLUENCE OF DOUBLE OPERATIONS.

| In One Sitting. | No. of Eyes. | Visual Results. | | | | | | Operation. | | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{60}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 | n. | dist. | good. | dist. |
| Single operations . . | 60,2% | 59,70 | 17,7% | 4,8% | 1,6% | 12,9% | 3,2% | 32,3% | 67,7% | 41,9% | 58,1% |
| | 62 | 37 | 11 | 3 | 1 | 8 | 2 | 20 | 42 | 26 | 36 |
| Double operation . . | 39,8% | 65,9% | 7,3% | — | 4,9% | 14,6% | 7,3% | 57,0% | 43,0% | 65,9% | 34,1% |
| | 41 | 27 | 3 | — | 2 | 6 | 3 | 23 | 18 | 27 | 14 |

| Method of Second Operation. | No. | Operation. | | Healing. | | Method of First Oper. | No. | Operation. | | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n. | c. | good | dist. | | | good. | dist. | good. | dist. |
| E. up with Gr's k. | 6 | 3 | 3 | 2 | 4 | Extr. down with Gr's k. | 6 | 2 | 4 | 3 | 3 |
| " d. " " | 15 | 13 | 2 | 13 | 2 | | 15 | 4 | 11 | 9 | 6 |
| " " " R's " | 1 | 1 | — | 1 | — | | 1 | 1 | — | 1 | — |
| " " " Beer's " | 2 | 2 | — | 1 | 1 | | 2 | 2 | — | 1 | 1 |
| " after Mooren . | 1 | 1 | — | — | 1 | | 1 | 1 | — | — | 1 |
| " " Liebreich . | 1 | — | 1 | — | 1 | | 1 | — | 1 | — | 1 |

In twenty-seven cases other changes occurred in the operated eye: eighteen times, conj. catarrh (course of healing: eleven good, seven disturbed; sixteen good and two bad results); twice, mac. corn. (two good results, one good and one disturbed course of healing); higher degree of myopia (2 good results, one good and one disturbed course of healing; Nystagmus (two good results, two disturbed recoveries). In three cases the complication consisted in dacryocystoblennorrhœa, pterygium, and ptosis (in each, good results but disturbed recovery).

In twelve cases one eye was previously operated upon for cataract. Almost equally proportionate figures of the last operations—ten good, one medium, one bad, results—correspond to the results obtained first (nine good, two medium, one bad). Thirteen cases who were operated upon called again some time after being discharged. The acuteness of sight had improved in all cases.

Discisio per corneam was performed once (simple cat. secd., one month after the first operation, good result); discisio per scleram twice (cat. secd. membr., one resp. three months after the first operation; one positive and one negative result). Iridectomy was performed three times (once one month after the first operation, twice three months) in cat. secd. accret., with good result.

II.—*The Extraction Downward with von Rothmund's Knife.*

Total number, 166 (16 accr.). Visual results: 117 (10) = $\frac{1}{10}$; 14 (1) = $\frac{1}{20}$; 8 (1) = $\frac{1}{60}$; 3 = $\frac{1}{200}$; 15 (2) = $\frac{1}{\infty}$; 9 failures (2). Cat. secd., 34 times. Failure in cat. uncompl., 4.06 %,

I.—INFLUENCE OF AGE ON VISUAL RESULT.

| Age. | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{300}$ | $\frac{1}{\infty}$ | 0 |
| | 0,6% | — | — | — | — | 100% | — |
| 10—20 . . | 1 (1) | — | — | — | — | 1 (1) | — |
| | 1,2% | 100% | — | — | — | — | — |
| 20—30 . . | 2 (1) | 2 (1) | — | — | — | — | — |
| | 1,2% | 50% | — | — | — | 50% | — |
| 30—40 . . | 2 (1) | 1 | — | — | — | 1 (1) | — |
| | 8,4% | 50% | 28,6% | 7,1% | — | 7,1% | 7,1% |
| 40—50 . . | 14 (2) | 7 (1) | 4 | 1 (1) | — | 1 | 1 |
| | 21,7% | 91,6% | — | 2,8% | — | 2,8% | 2,8% |
| 50—60 . . | 36 (3) | 33 (2) | — | 1 | — | 1 | 1 (1) |
| | 48,2% | 72,5% | 6,25% | 3,75% | 2,5% | 10,0% | 5,0% |
| 60—70 . . | 80 (4) | 58 (4) | 5 | 3 | 2 | 8 | 4 |
| | 17,5% | 55,2% | 10,34% | 10,34% | 3,4% | 10,34% | 10,34% |
| 70—80 . . | 29 (3) | 16 (2) | 3 | 3 | 1 | 3 | 3 (1) |
| | 0,6% | — | 100% | — | — | — | — |
| 80—90 . . | 1 (1) | — | 1 (1) | — | — | — | — |
| | 0,6% | — | 100% | — | — | — | — |
| Not recorded | 1 | — | 1 | — | — | — | — |

II.—INFLUENCE OF THE CHARACTER OF THE CATARACT.

| Cataract. | No. | Visual Results. | | | | | | Operation. | | Prol. of Vitr. | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{300}$ | $\frac{1}{\infty}$ | 0 | good. | dist. | | good. | dist. |
| | 69,3% | 69,6% | 8,7% | 4,3% | 1,7% | 10,4% | 5,2% | 42,6% | 57,4% | 14,80% | 53,9% | 46,1% |
| Cat. mat. | 115 | 80 | 10 | 5 | 2 | 12 | 6 | 49 | 66 | 17 | 62 | 53 |
| C. matu- | 12,1% | 70% | 15% | 5% | 5% | 5% | — | 65% | 35% | 5% | 55% | 45% |
| resc. . | 20 | 14 | 3 | 1 | 1 | 1 | — | 13 | 7 | 1 | 11 | 9 |
| C. hyper- | 8,4% | 85,7% | — | 7,14% | — | — | 7,14% | 28,6% | 71,4% | 21,4% | 64,3% | 35,7% |
| mat. . | 14 | 12 | — | 1 | — | — | 1 | 4 | 10 | 3 | 9 | 5 |
| | 9,6% | 62,5% | 6,25% | 6,25% | — | 12,5% | 12,5% | 18,75% | 81,25% | 31,25% | 31,25% | 68,75% |
| C. accreta | 16 | 10 | 1 | 1 | — | 2 | 2 | 3 | 13 | 5 | 5 | 11 |
| Cat. dia- | 0,6% | 100% | — | — | — | — | — | — | — | — | — | 100% |
| betica | 1 | 1 | — | — | — | — | — | 1 | — | — | — | 1 |

CASES.

Cat. moll. mat. o. d. V. $= \frac{1}{\infty}$; cat. moll. maturesc. o. s., V $= \frac{1}{300}$ Diabetes mellitus, woman, twenty-eight years of age; laborer; myopic from childhood. R eye: the section not quite exact, on account of patient pressing very much. Puncture and counter-puncture lie in the cornea, therefore, small flap section. The greatest portion of the cataract comes out by itself after cystotomy. The remainder removed by rubbing. Adh.-pl. band. Cystoid scar at the counter-puncture, of which only a trace exists three

months after the operation. Recovery otherwise without irritation. V = $\frac{1}{3}$.

III.—INFLUENCE OF THE COURSE OF OPERATION.

| Operation. | No. | Visual Results. | | | | | | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{300}$ | $\frac{1}{\infty}$ | 0 | good. | dist. |
| | 42,2% | 80% | 10% | — | 1,4% | 5,7% | 2,9% | 57,1% | 42,9% |
| Uncomplicated . . . . | 70 (3) | 56 (3) | 7 | — | 1 | 4 | 2 | 40 (2) | 30 (1) |
| | 57,8% | 63,5% | 7,3% | 8,3% | 2,1% | 11,5% | 7,3% | 48,9% | 51,1% |
| Complicated . . . . . | 96 (13) | 61 (7) | 7 (1) | 8 (1) | 2 | 11 (2) | 7 (2) | 47 (3) | 49 (10) |

| Complications of the Operation. | No. | Visual Results. | | | | | | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{300}$ | $\frac{1}{\infty}$ | 0 | good. | dist. |
| | 10,4% | 60% | 20% | — | — | 10% | 10% | 70% | 30% |
| 1. Compl. iridectomy . | 10 | 6 | 2 | — | — | 1 | 1 | 7 | 3 |
| 2. Copious hemorrhage in | 12,5% | 75% | — | 8,3% | — | 16,7% | — | 25% | 75% |
| ant. ch. . . . . | 12 | 9 (1) | — | 1 | — | 2 | — | 3 | 9 (1) |
| | 8,3% | 37,5% | — | 25% | — | 12,5% | 25% | 62,5% | 37,5% |
| 3. Laborious expulsion . | 8 | 3 | — | 2 | — | 1 (1) | 2 | 5 | 3 (1) |
| 4. Laborious expulsion | 5,2% | 60% | 20% | — | — | 20% | — | 20% | 80% |
| with complications . | 5 | 3 | 1 | — | — | 1 | — | 1 | 4 |
| | 3,12% | 100% | — | — | — | — | — | 100% | — |
| 5. Rapid escape of lens . | 3 | 3 | — | — | — | — | — | 3 | — |
| | 5,2% | 40% | 20% | — | — | 40% | — | 40% | 60% |
| 6. Remnants of lens . . | 5 | 2 | 1 | — | — | 2 | — | 2 | 3 |
| | 5,2% | 20% | — | 20% | 20% | 20% | 20% | — | 100% |
| 7. Loss of vitreous . . | 5 | 1 | — | 1 | 1 | 1 | 1 | — | 5 |
| 8. Loss of vitr. complic. | 10,4% | 80% | 20% | 20% | — | — | — | 50% | 50% |
| with introdt. of instr. | 10 | 8 (2) | 1 | 1 | — | — | — | 5 | 5 (2) |
| 9. Loss of vitr. complic. | 3,12% | 33,3% | — | — | — | 33,3% | 33,3% | 33,3% | 66,7% |
| with remnants of lens | 3 | 1 | — | — | — | 1 | 1 (1) | 1 | 2 (1) |
| 10. Loss of vitr. complic. | | | | | | | | | |
| with introdt. of instr. | 6,25% | 16,7% | — | 16,7% | 16,7% | 3,3% | 16,7% | 16,7% | 83,3% |
| and remnants of lens | 6 | 1 | — | 1 | 1 | 2 (1) | 1 (1) | 1 | 5 (2) |
| 11. Loss of vitreous with | 1,04% | 100% | — | — | — | — | — | 100% | — |
| hemorrhage in ant. ch. | 1 | 1 | — | — | — | — | — | 1 | — |
| 12. Loss of vitreous with | 1,04% | 100% | — | — | — | — | — | — | 100% |
| rapid expulsion of lens | 1 | 1 | — | — | — | — | — | — | 1 |
| 13. Introduction of instru- | 18,8% | 94,4% | 5,6% | — | — | — | — | 77,8% | 22,2% |
| ments in ant. ch. . . | 18 | 17 (2) | 1 (1) | — | — | — | — | 14 (2) | 4 (1) |
| 14. Introd. of instr. in ant. | 9,4% | 55,6% | 11,1% | 22,2% | — | — | 11,1% | 44,4% | 55,6% |
| ch. with complications | 9 | 5 (2) | 1 | 2 (1) | — | — | 1 | 4 (1) | 5 (2) |

CASES.

1. Cat. mat. oc. s., cat. accret. o. d., woman, seventy-six years of age. Operation on the left eye. A very restless patient. Therefore iridectomy rendered very difficult. A great loss of vitreous (about $\frac{1}{2}$ to $\frac{2}{3}$ of its volume) occurred after the expulsion of the lens, without any interference. Normal course of healing,

but cat. secd. Discharged on the twenty-fourth day with very hazy vitreous. V = $\frac{1}{60}$.

2. Cat. semid. mat. o. d., synicesis pup. and iridoconus o. s. in a man, sixty-four years of age. Double operation. L: iridotomy (according to Wecker). R: ext. downward with R.'s knife. The iris can not be seized. Then cystotomy. Upon pressure the nucleus comes forward and bulges the iris, which now is excised. Then expulsion by means of "sledge-manœuvre." Cornea shrinks in folds. Cortical matter removed by rubbing. Adh.-pl. band. Normal recovery in both. In the eye operated upon, V = $\frac{1}{8}$ on the tenth day.

3. Cat. matur. o. s., woman, fifty-eight years of age. Cat. prope mat. oc. d. Section somewhat too small, has twice to be enlarged with curved scissors; moderate prolapse of vitreous. Normal recovery. V = $\frac{1}{3}$. Adh.-pl. band. Discharged on the fifteenth day.

CASES (REFERRING TO TABLE IV. NEXT PAGE).

1. Cat. mat. dur. oc. utr., in a man, sixty-eight years of age. Conjunctivitis cat. oc. utr. Double operation.

L: section downward with Rothmund's knife. Directly after the section being performed liquefied vitreous oozes; nucleus dislocated, is extracted with the metal spoon; intense hemorrhage into the anterior chamber. Adh.-pl. band. Iritis adhæsiva totalis, terminating into atresia pupillæ. V = $\frac{1}{\infty}$

R: extraction according to Critchett; operation complicated by instruments and prolapsus corporis vitrei. Adh.-pl. band. Iridocyclitis; phthisis bulbi. V = o. Discharged on the twenty-fifth day.

2. Cat. mat. oc. utr., woman, sixty years of age. Double operation.

R: in opening the capsule the cataract sticks at the cystotome and comes out with it.

L: operation complicated by instruments and remaining fragments of lens. Adh.-pl. band. Recovery normal in both. V = $\frac{1}{4}$. Discharged on the fifteenth day.

3. Cat. dur. mat. o. d., healthy man, sixty-nine years of age. Operation without any disturbance. Adh.-pl. band. On the second day violent pain. Keratitis purulenta, terminating into phthisis bulbi.

4. Cat. mat. o. d., man seventy-six years of age. Constitution good. Course of operation normal, but a bruise of the conjunctival

IV.—INFLUENCE OF THE COURSE OF HEALING.

| Healing. | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{180}$ | $\frac{1}{\infty}$ | 0 |
| Uncomplicated . | 52,4% | 88,5% | 3,4% | 6,9% | 1,2% | — | — |
| | 87 (5) | 77 (4) | 3 (1) | 6 | 1 | — | — |
| Complicated . . | 47.6% | 50,6% | 13,92% | 2,53% | 2,53% | 19,0% | 11,4% |
| | 79 (11) | 40 (6) | 11 | 2 (1) | 2 | 15 (2) | 9 (2) |

| Complications of the Healing Process | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{30}$ | $-\frac{1}{60}$ | $-\frac{1}{180}$ | $\frac{1}{\infty}$ | 0 |
| 1. Tardy closure . . | 3,8% | 66,7% | — | 33,3% | — | — | — |
| | 3 | 2 | — | 1 | — | — | — |
| 2. Sec. hem. in ant. ch. | 1,2% | — | 100% | — | — | — | — |
| | 1 | — | 1 | — | — | — | — |
| 3. Cystoid scar . . . | 3,8% | 66,7% | 33,3% | — | — | — | — |
| | 3 | 2 | 1 | — | — | — | — |
| 4. Incarceration of iris | 11,4% | 100% | — | — | — | — | — |
| | 9 (1) | 9 (1) | — | — | — | — | — |
| 5. Incarteration of iris with cat. secd. . . | 5,1% | 50% | 50% | — | — | — | — |
| | 4 | 2 | 2 | — | — | — | — |
| 6. Irritic irritation . . | 15,2% | 83,3% | 16,7% | — | — | — | — |
| | 12 (1) | 10 (1) | 2 | — | — | — | — |
| 7. Irit. plast. c. cat. sec. | 22,8% | 61,1% | 16,7% | — | — | 22,2% | — |
| | 18 (3) | 11 (2) | 3 | — | — | 4 (1) | — |
| 8. Iridocapsulitis . . | 1,2% | — | — | — | — | 100% | — |
| | 1 | — | — | — | — | 1 | — |
| 9. Iridocyclitis serosa | 1,2% | — | 100% | — | — | — | — |
| | 1 | — | 1 | — | — | — | — |
| 10. Iridocyclitis serosa with cat. sec. . . | 2,5% | — | — | — | 100% | — | — |
| | 2 | — | — | — | 2 | — | — |
| 11. Iridocyclit. adhæs. tot. occlus pup, . . | 5,1% | — | — | — | — | 100% | — |
| | 4 (1) | — | — | — | — | 4 (1) | — |
| 12. Swelling of remnants of lens . . . . | 5,1% | — | — | 25% | — | 75% | — |
| | 4 (1) | — | — | 1 (1) | — | 3 | — |
| 13. Swelling of remnants of lens with after-hem. in ant. ch. . | 5,1% | 75% | 25% | — | — | — | — |
| | 4 (2) | 3 (2) | 1 | — | — | — | — |
| 14. Marginal keratitis | 2,5% | 50% | — | — | — | 50% | — |
| | 2 | 1 | — | — | — | 1 | — |
| 15. Keratitis purulenta | 5,1% | — | — | — | — | 50% | 50% |
| | 4 | — | — | — | — | 2 | 2 |
| 16. Panophthalmia . | 8,9% | — | — | — | — | — | 100% |
| | 7 (2) | — | — | — | — | — | 7 (2) |

flap during the section being performed. Adh.-pl. band. Purulent infiltration of the wound. Panophthalmia. V = o. Discharged on the thirty-fifth day.

*Method of Dressing* (*in uncomplicated operation*).

Fifty-three times adhesive plaster (43 = $-\frac{1}{10}$, 3 = $-\frac{1}{30}$,

$1 = -\frac{1}{200}$, $4 = \frac{1}{\infty}$; 2 = 0; 28 normal, 25 disturbed course of healing.

Nine times borated lint ($1 = -\frac{1}{10}$, $1 = -\frac{1}{20}$; 7 times normal, twice disturbed course of healing).

Seven times salicylated jute ($5 = -\frac{1}{10}$, $1 = -\frac{1}{20}$; 5 normal, 2 disturbed course of healing).

Once compressive roller ($1 = -\frac{1}{20}$; 1 disturbed course of healing).

*The duration of healing in uncomplicated course of operation and healing.*

Adhesive-plaster bandage, 28: 10 days 8, 15 days 14, 20 days and more 6; borated lint, 8: 10 days 6, 15 days 2; compressive roller, 4: 10 days 1, 15 days 2, 20 days and more 1.

V.—INFLUENCE OF DOUBLE OPERATION.

| In one Sitting. | No. | Visual Results. | | | | | | Course of Operation. | | Recovery. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{30}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 | n. | c. | n. | c. |
| Single Op. | 51,8% | 67,4% | 8,1% | 4,7% | — | 10,5% | 9,3% | 41,9% | 58,1% | 47,7% | 52,3% |
| | 86 (9) | 58 (5) | 7 | 4 | — | 9 (2) | 8 (2) | 36 (1) | 50 (8) | 41 (1) | 45 (8) |
| Double Op. | 48,2% | 73,75% | 8,75% | 5,0% | 3,75% | 7,5% | 1,25% | 35,0% | 65,0% | 63,75% | 36,25% |
| | 80 (7) | 59 (5) | 7 (1) | 4 (1) | 3 | 6 | 1 | 28 (2) | 52 (5) | 51 (4) | 29 (3) |

| Method of Second Operation. | No. | Course of Operation. | | Course of Healing. | | Meth. of First Operat. | No. | Course of Operation. | | Course of Healing. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n. | dist. | good | dist. | | | n. | dist. | good | dist. |
| Graefe upward . . | 21 | 11 | 10 | 9 | 12 | Rothmund d. | 21 (2) | 8 (1) | 13 (1) | 12 | 9 (2) |
| Graefe downward . | 1 | 1 | — | 1 | — | | 1 | 1 | — | 1 | — |
| Rothmund upward | 2 | 2 | — | 2 | — | | 2 | — | 2 | 2 | — |
| Rothmund downward | 25 | 14 | 11 | 20 | 5 | | 25 (5) | 4 (1) | 21 (4) | 16 (4) | 9 (1) |
| Pagenstecher . . . | 1 | 1 | — | — | 1 | | 1 | — | 1 | — | 1 |
| Critchett . . . . | 3 | — | 3 | — | 3 | | 3 | 1 | 2 | — | 3 |
| Weber . . . . . | 2 | 2 | — | — | 2 | | 2 | — | 2 | — | 2 |

*The complications; total number* 33.

Twenty-one times conj. cat. (7 normal recovery, 14 disturbed; 19 good V, 2 bad V); 4 times mac. corn. (3 normal recovery, 1 disturbed; 4 good V); 2 times iritis in the other eye (2 dist. rec., but 2 good results); 2 times strabism. corn. (recovery and visual result good). One dacryocystitis and 1 ulc. corn. with hypopyon; in both cases bad course of healing and bad visual result. One myopia and 1 pterygium; both

with good result. In 5 cases (3.0%), of which 4 had a good and 1 a bad result, extraction was previously performed on the other eye (3 good, 1 medium, and 1 bad result).

V could be tested again in 38 cases (22.9%). V had improved 37 times; once a considerable deterioration took place in consequence of cyclitis supervening later.

The simple cat. secd. was operated upon six times with good result: twice by disc. per corneam (1 month and 3 months after the first operation), twice by disc. per scler. (1 month and 3 months after the first operation), twice by iridectomy (3 months after first operation). The result obtained by the secondary operation in cat. secd. accret. was satisfactory in all 9 cases: 5 disc. p. scl. (one 1 month, three 2 months, two 3 months after first operation); 4 iridectomies (one 1 month, two 2 months, one 3 months after fiirst operation).

Comprising all uncomplicated cases extracted upward and downward with Graefe's or Rothmund's knife we obtain the following result:

Total number = 1,160. Of these: 833 (71.8%) V = $-\frac{1}{10}$; 122 (10.5%) = $-\frac{1}{20}$; 47 (4.1%) = $-\frac{1}{60}$; 23 (2.0%) = $-\frac{1}{200}$; 88 (7.5%) = $\frac{1}{\infty}$ with chances of a good result; 87 (4.1%) = $\frac{1}{\infty}$ hopeless. Cat. secd. 189 = 16.2%.

If we divide these figures among the great columns of good and bad results, according to Dantone, the following proportion is obtained:

Total number, 1,160: good, 1,025, = 88.4% bad, 135, = 11.6%

with preservation of the form, 88, = 7.5% Phthis., 47, = 4.1%

For comparison we repeat Dantone's statements:

Scleral extraction, 186: good, 157, = 84.4% bad, 29, = 15.6%

with preservation of the form, 23, = 12.3% Phthis., 6, = 3.3%

If we separate the uncomplicated cataracts, operated upon by a section upward from those downward (without

regard of the instrument used for the section) the proportion of figures is the following:

| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{60}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 | Cat.secd. |
|---|---|---|---|---|---|---|---|---|
| Extr. upward . | 907 | 73.0% | 10,4% | 4,1% | 1,9% | 6,7% | 3,8% | 15,3% |
| | | 662 | 95 | 37 | 17 | 61 | 35 | 139 |
| Extr. downward | 253 | 67,5% | 10,7% | 3,9% | 2,4% | 10,7% | 4,7% | 19,7% |
| | | 171 | 27 | 10 | 6 | 27 | 12 | 50 |

On account of completeness and better review we give the figures, resulting from taking out the uncomplicated cases of each method:

| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{60}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 | Cat.secd. |
|---|---|---|---|---|---|---|---|---|
| E. up with Gr's k. | 869 | 72,8% | 10,7% | 4,0% | 1,8% | 6,7% | 3,9% | 15,4% |
| | | 633 | 93 | 35 | 16 | 58 | 34 | 34 |
| " " R's " | 38 | 76,3% | 5.3% | 5,3% | 2,6% | 7,9% | 2,6% | 13,1% |
| | | 29 | 2 | 2 | 1 | 3 | 1 | 5 |
| E. down w. Gr's " | 103 | 62,1% | 13,6% | 2,9% | 2,9% | 13,6% | 4,9% | 15,5% |
| | | 64 | 14 | 3 | 3 | 14 | 5 | 16 |
| " " R's " | 150 | 71,3% | 8,67% | 2,0% | 2,0% | 8,67% | 4,66% | 22,6% |
| | | 107 | 13 | 3 | 3 | 13 | 7 | 34 |

The question as to the proportion of the results to the method of after-treatment is answered by the two following tables, of which the first comprises all 1,233 cases, the second includes only those cataracts in which the operation was normal.

| Dressing. | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{60}$ | $-\frac{1}{200}$ | $\frac{1}{\infty}$ | 0 |
| Adhesive plaster | 875 | 72,1% | 8,6% | 4,0% | 2,05% | 8,6% | 4,7% |
| | | 631 | 75 | 35 | 18 | 75 | 41 |
| Borated lint . . | 196 | 71,9% | 16,3% | 4,6% | 1,0% | 2,6% | 3,6% |
| | | 141 | 32 | 9 | 2 | 5 | 7 |
| Salicylated jute . | 69 | 63,8% | 15,9% | 4,35% | 5,8% | 8,7% | 1,45% |
| | | 44 | 11 | 3 | 4 | 6 | 1 |
| Lister's antisepsis | 38 | 68,4% | 15,8% | — | 5,3% | 7,9% | 2,6% |
| | | 26 | 6 | — | 2 | 3 | 1 |
| Compressive roller | 36 | 66,7% | 5,6% | 2,7% | — | 16,7% | 8,3% |
| | | 24 | 2 | 1 | — | 6 | 3 |
| A. Graefe's new antisepsis . . | 19 | 63,1% | 15,8% | — | — | 15,8% | 5,3% |
| | | 12 | 3 | — | — | 3 | 1 |

| Method. | No. | Visual Results. | | | | | |
|---|---|---|---|---|---|---|---|
| | | $-\frac{1}{10}$ | $-\frac{1}{20}$ | $-\frac{1}{50}$ | $-\frac{1}{100}$ | $\frac{1}{8}$ | 0 |
| Adhesive plaster | 444 | 77,5% | 9,2% | 2,9% | 2,9% | 6,5% | 1,8% |
| Borated lint . . | 84 | 78,6% | 11,9% | 3,57% | — | 2,38% | 3,57% |
| Salicylated jute . | 43 | 69.7% | 18,6% | 4.7% | 4.7% | — | 2,3% |
| Lister's antisepsis | 33 | 78,7% | 9,1% | — | — | 6,1% | 6,1% |
| Compressive roller | 19 | 52,6% | 26,3% | — | — | 15,8% | 5,3% |
| A. Graefe's bandage | 5 | 60% | 20% | — | — | — | 20% |

If we compare the general visual result, etc., of the four modifications of the scleral section above discussed, it becomes evident, that the results of the section upward, and especially those of Rothmund's modification, are better than those of the section downward, in which even Rothmund's knife prevails in its good result. While in both sections the middle figures differ proportionately little one from another, the number of losses in extractions downward has diminished in Rothmund's method amply $\frac{2}{3}$ in favor of the good results, but in Graefe's operation upward it has increased about $\frac{1}{3}$. This fact seems the more striking, as "Rothmund upward" shows the most complicated courses of operation, the percentage of the other methods remaining about the same. This disposition is apparently brought about by the small number of the extractions upward, performed with Rothmund's knife. The tables show clearly the influence of the complicated course of operation upon the sight and the good and bad results, whereas the middle figures remain almost equal; but even here the proportion is changed in "Rothmund upward" by a small numeral increase. On closer examination of the course of operation we observe a perceptible difference in the occurrence of loss of vitreous, being over 6% more frequent in the methods downward. The difference in the visual result will not surprise us so much, as according to our tables the loss of vitreous gives the highest percentage of failures, especially in connection with other accidents (introduction of instruments into the anterior chamber, leaving of remnants of lens, etc.).

The course of operation was more frequently complicated by the introduction of instruments and remaining lens-mat-

ter; the number of losses however are far less than those of prolapse of vitreous and remain pretty equal in all methods.

Of the other irregularities, the results of which have to be considered with great caution on account of the relatively small figures, we have to mention: the laborious expulsion of lens with complications (6 losses and 11 V. = $\frac{1}{\infty}$; even here the highest percentage of 25 % occurred in the operation downward), the complicated iridectomy with three, the rapid expulsion of lens with two, and intense hemorrhage into the anterior chamber (iris) with one loss.

The disturbances of the course of healing are mostly caused by iritis and iridocyclitis; far less by the reaction of the wound edges, the cornea, and vitreous. Only the section downward shows even here higher percentages. Of the affections of iris, iridocyclitis adhæsiv. total. gives the worst prognosis, causing, for instance, 38.7 % loss of the eye in extractions upward. The iridocapsulitis gives 4.5 % loss. The plastic form with cat. secd. is the most frequent; the mean numbers of the results are pretty equally divided between it and the other reactive processes (excl. keratitis purul. and panophthalmia).

Considering the character of cataract, we notice the worst results in cataracta accreta. The table of the extraction downward does not seem to prove this; but the numbers are too small for being regarded at all. Then cataracta supermatura and maturescens come in the range of minor results. The latter kinds of cataract are more frequent in extractions downward, which may explain the serious complications of the course of the operation and healing, and the bad visual results. Furthermore, the formation of coloboma downward (considering its disagreeable glaring effects) was done especially when there was synchysis of the vitreous or an accident was feared, as laborious expulsion of lens or prolapse of the vitreous (for instance in very restless patients, who could only with difficulty, if at all, be induced to look down or in very prominent or deep-seated eyes).

The age was pretty equal in all methods and beyond fifty years, a decrease of good, and an increase of bad results takes place, except in Rothmund's modification upward,

which has to be left out of consideration. It would be wrong to conclude from this fact a direct connection with the diminished healing tendency and the diminished general and local resistancy of age to traumatisms. These last factors, however, have to be drawn in consideration, regarding the failures in the operation for cataract. Useful informations in that respect are only to be derived from much larger and more careful statements than ours.

The complications of the eye and its neighboring organs, mentioned together with the cataracta accreta, show too little direct effect upon the final result of the operations, as even to attempt to form the prognosis of the sight to be regained from the kind of such complication.

The sight could be tested again in 304 cases, and was in 289 better or the same, in 15 worse. A condensation of the secondary cataract was mostly the cause of deterioration. In two cases lingering iridocyclitis existed. Once phthisis bulbi supervened after atresia pupillæ. One eye was operated upon previously in 81 cases, and the results in the eye first operated upon are: 54 good, 15 middle, and 12 bad; in the second eye: 69 good, 5 middle, and 7 bad, so that an important amelioration of the result can be noticed in the second eye. In simple secondary cataract 18 times discisio per corneam was performed, 13 times p. scler., in 7 cases iridectomy, in 2 reclination, and one iridotomy; only one discisio p. scler. did not improve the sight.

The operation of cat. sec. accret. and of pupillary exudations was, in 40 cases: 18 times discisio p. scleram, 14 times iridectomy, 7 times iridotomy, once paracentesis; the result was always perfectly good, except in 2 cases of iridectomy, in which an improvement after the operation could not be observed.

In the discussion of the remaining operations we have omitted to arrange tables in the above manner: 1, for simply typographical reasons; 2, because the figures of extractions with preparatory iridectomy, and of the methods of Pagenstecher, Weber, Liebreich, etc., are too small for tables in comparison to those given above. It seemed, however, indicated, to report shortly even about the results of these ex-

tractions, partly performed only as an experiment (for inst., Liebreich's and Weber's methods); 1, for the completeness of the report; 2, because we deal with methods giving a very small material.

I.—*Downward Extraction by Liebreich's Section.*

Prof. Rothmund made Liebreich's section 12 times. Being compelled, however, each time in the first cases to make an excision of the iris afterward, he performed iridectomy in the remaining 7 cases. Therefore only the situation of the wound was according to Liebreich.

1. Cat semid. maturescens o. s., cat. mat. o. d., woman fifty-six years of age. Double operation. R: per scler. with Graefe's knife, (repeated cystotomy). Adh.-pl. band. Normal recovery. V = $\frac{1}{20}$; cat. secd. L: according to Liebreich. Repeated later excision of iris necessary for the expulsion of the lens. Adh.-pl. band. V = $\frac{1}{8}$.

2. Cat. semidura matura o. d., man sixty-five years of age. Repeated iridectomy necessary. Adh.-pl. band. Recovery without irritation. V = $\frac{1}{8}$.

3. Cat. semimat. o. s., woman sixty-one years of age. A piece of iris, prolapsed after the expulsion of lens, has to be excised afterward. Adh.-pl. band. On the fourteenth day after the operation, wound not entirely closed; iris in the wound. Cystoid scar. Discharged on the twentieth day with V = $\frac{1}{8}$; four months later V = $\frac{1}{4}$.

4 and 5. Cat. accret. o. u., man sixty-nine years of age. Double operation. The patient is very restless and presses very much. In both, iris prolapses into the wound and has to be excised. Lens removed by pressure. Adh.-pl. band. Recovery: in both, moderate ciliary injection. Discharged on the fifteenth day with V = $\frac{2}{3}$ in both.

6. Cat. supermat. o. s., cat. semid. mat. o. d., man sixty-nine years of age. Double operation. R: per scl. with Graefe's knife. Normal course of operation and healing. On the thirteenth day eye without irritation; V = $\frac{5}{40}$. L: according to Liebreich. Cystotomy twice. Slow expulsion of lens. Adh.-pl. band. In the second night the patient gets up and moves the bandage. Afterward heavy pain; on the next morning iritis and cat. secd. observed. Intense photophobia. On the thirteenth day eye without irritation. V = $\frac{1}{60}$ (cat. secd.).

7. Cat. semid. mat. o. s., woman sixty-five years of age. Normal operation. Salicylated jute. Course of healing disturbed by iritis plastica with cat. secd. V = $\frac{1}{6}$. Discharged on the fifteenth day.

8 and 9. Cat. mat. o. utr., man sixty-seven years of age. Pterygium, conj. catarrh. chron. o. utr. Double operation. R: with Graefe's knife; considerable hemorrhage into the anterior chamber. L: with Rothmund's knife. Normal operation. Adh.-pl. band. R: normal recovery. V = $\frac{1}{2}$. L: irit. plast. with second. catar. V = $\frac{1}{60}$. Discharged on the fifteenth day. One month later, disc. cat. secd. o. s. p. corn. V = $\frac{1}{30}$.

10. Cat. mat. o. s., woman seventy-three years of age, apparently healthy. Operation somewhat difficult, the patient being restless, but without direct complications. Adh.-pl. band. On the fifth day keratit. purul.; panophthal. V = o. Discharged on the forty-eighth day.

11. Cat. mat. o. s., woman, sixty-six years of age, of good general health. Blepharophimosis o. u.; conj. cat. One month before extr., canthoplasty. Normal operation. Salicylated jute band. On the fourth day keratit. purul., then panophthalmia. V = o. Discharged on the forty-second day.

12. Cat. mat. o. utr., woman, seventy-five years of age. Somewhat narrow palpebral fissure. Double operation. R: per scler. with Graefe's knife. Complicated by hemorrhage into the anterior chamber, and instruments. Salicylated jute band. Irit. plast. with second. cat. V = $\frac{1}{5}$. L: accord. to Liebreich. Operation compl. by prolapse of vitreous (prolapse removed). Salicyl. jute band. Enclosure of iris. V = $\frac{1}{10}$. Discharged on the twenty-second day.

## II.—*Extraction Upward with Weber's Concave Lance-shaped Knife.*

It was performed only in 10 cases; our histories of operations therefore prove as little pro or contra the advantage of this special method, as the above-reported cases operated upon by Liebreich's section. All ten cataracts were extracted by the section upward, and an iridectomy performed according to Ad. Weber. The simple adhesive-plaster occlusion was used as bandage without exception.

1. Cat. maturescens o. d., woman, thirty years of age. Four weeks previously, cat. maturesc. of the left eye, operated upon upward with Graefe's knife (normal course of operation and healing;

V = $\frac{1}{2}$). In the second eye, operation complicated by introduction of instruments. Adh.-pl. band. Iritic irritation. Discharged on the twenty-second day with V = $\frac{1}{2}$.

2. Cat. non. mat. semid. o. d., man, sixty years of age. Operation complicated by enlarging the wound with curved scissors; laborious expulsion of lens. Adh.-pl. band. Normal recovery. Discharged on the seventeenth day. V = $\frac{1}{10}$.

3. Cat. mat. accret. o. d., woman, fifty-six years of age. Cat. mat. semid. of the other eye, operated upon at the same time by a section upward with Rothmund's knife. In this eye normal course of operation. The operation on the right eye complicated by instruments. Adh.-pl. band. Course of healing disturbed in both: in the right eye by iritis serosa; left, by encarceration of iris. Both, V = $\frac{1}{3}$. Adh.-pl. band. Discharged on the fifteenth day.

4. Cat. accret. o. s., cat. semimat. o. d., leucoma adhærens o. u.; globes very prominent; man, sixty-seven years of age. Double operation. R: upward with Graefe's knife. L: according to Weber. Operation in both complicated by laborious expulsion of lens. Adh.-pl. band. R: complicated course of healing, iridocycl. with occl. of pupil; V = $\frac{1}{\infty}$ L: cat. secd.; V = $\frac{1}{100}$.

5. Cat. semid. mat. o. d., woman, fifty-two years of age. Operation complicated by introduction of instruments, in order to remove remaining cortical matter. Course of healing complicated by iritis plast. with cat. secd. Discharged on the fourteenth day. V = $\frac{1}{3}$.

6. Cat. dur. mat. o. s., woman, fifty-two years of age. Normal operation. Adh.-pl. band. Course of healing complicated by irritation of iris. Discharged on the tenth day with V = $\frac{1}{10}$.

7. Cat. dur. mat. oc. utr., woman, fifty-eight years of age, suffering from conj. catarrh. o. utr. Double operation. L: with Graefe's knife upward. R: accord. to Weber. L: normal operation and recovery. Adh.-pl. band. V = $\frac{1}{3}$. R: lens had to be extracted with the spoon in pieces. Some cortical matter remains. Adh.-pl. band. Purulent marginal keratitis. Discharged on the twenty-fourth day with V = $\frac{1}{100}$.

8. Cat. dur. supermat. o. d.; mat. o. s., man, fifty-three years of age. Double operation. R: with Rothmund's knife upward. L: according to Weber. R: normal operation. L: lens had to be extracted with the spoon, moderate loss of vitreous. Adh.-pl. band. Irritation of iris. V = < $\frac{1}{3}$. L: iridocycl. adhæs., terminating into occlusion of pupil. V = o. Discharged on the thirty-fifth day.

9. Cat. dur. supermat. o. u., man, seventy-two years of age. Double operation. L: upward with Graefe's knife. Normal operation and normal course of healing. Adh.-pl. band. V = $\frac{1}{4}$. R: according to Weber. Operation complicated by enlarging the wound with the curved scissors. Lens removed with Graefe's spoon and moderate prolapse of vitreous. Adh.-pl. band. Course of healing disturbed by marginal keratitis. Discharged on the thirty-fourth day with V = $\frac{1}{3}$.

10. Cat. supermat. o. u., woman, seventy-four years of age. Double operation. L: upward with Graefe's knife. R: according to Weber. L: operation complicated by laborious expulsion of lens. R: by introduction of instruments. Adh.-pl. band. Irritation of iris in both. Eyes without irritation on the tenth day. V = $\frac{1}{10}$ in both.

III.—*The Extraction of the Cataract within the Capsule.*

The method devised by A. Pagenstecher, and used by his brother Hermann with the same predelection and even better success, was not practised as a special method in our clinic, but was made use of only occasionally, and then mostly on the spur of the moment; for instance, if it was indicated by an intense hemorrhage into the anterior chamber, which could not be stopped after some waiting by rubbing or quickly changed iced applications, or if during the operation the case proved to be especially apt for the extraction of the lens within the capsule. The number of successful extractions performed in this manner is so small, that our experience in regard to the value of this original method can not be considered as determining. We believe, however, that we ought not to pass with silence the results attained by Pagenstecher's modification, on account of its great general interest.

1. Cat. mat. o. utr., man, sixty years of age. Double operation In one eye, extraction upward with Graefe's knife. Normal operation in both. Adh.-pl. band. In the eye operated upon according to Pagenstecher; on the second day slight irritation of iris, disappearing soon; on the other eye extensive cat. secd. On the twenty-fifth day dischaged with V = $\frac{5}{40}$ R, $\frac{5}{100}$ L.

2. Cat. mat. dur. oc. sin., delicate woman, fifty-three years of age, was successfully operated upon the other eye one year ago.

After the counterpuncture an enormous œdema of the conjunctiva supervenes. Prolapse of vitreous. Adh.-pl. band. Recovery without irritation. Discharged with V = $\frac{1}{3}$ on the twelfth day.

3. Cat. mat. oc. d., woman, sixty-six years of age. The other eye was successfully operated upon for cataract (with Graefe's knife downward) three months ago. Prolapse of vitreous ($\frac{2}{3}$). Borated lint. On the fifth day small hernia of vitreous in the wound. On the tenth day hemorrhagic exudation observed in the depth of the pupil (vitreous?). Cystoid bulging of the wound and reunion of the edges of the coloboma. Discharged on the twentieth day with V = $\frac{1}{3}$ (dusty opacities of the vitreous and secessus retinæ in lower temporal quadrant).

4. Cat. mat. oc. dext., man, forty-five years of age. Large prolapse of vitreous. Borated lint. On the fourth day chemosis of the conjunctiva bulbi and hyphæma. Hernia of vitreous in the wound; otherwise good course of healing. V = $\frac{2}{3}$. Discharged on the twenty-first day.

5. Cat. dur. mat., man, sixty-eight years of age. General health good, but a hernia inguinalis. Extraction upward with Rothmund's knife. Moderate prolapse of vitreous. Adh.-pl. band. Iridocyclitis serosa and synicesis pupillæ. Discharged on the thirty-third day with V = $\frac{1}{200}$.

6. Cat. dur. nigr. mat. o. s., woman, forty years of age, hard of hearing; six years ago operated for cataract, right, unsuccessfully. Leucoma adhærens. V = $\frac{1}{\infty}$. Extraction per scler. downward with Rothmund's knife. Operation successful. On the fourth day cat. secd. (?) observed, filling up the pupil entirely. On the eighteenth day V = $\frac{1}{60}$. On the thirty-fourth day after the operation, discis. per corn. without success. On the fifty-third day after the first operation an attempt is made to extract the secd. cat. Then the cat. secd. shrinks more and more. On the eighty-sixth day the patient is discharged with an almost entirely black pupil. V = $\frac{1}{4}$.

7. Cat. dur. mat. o. utr., man, sixty-one years of age, feels very sick from a chronic bronchitis. Double operation. R: downward with Rothmund's knife. Normal extraction. Adh.-pl. band. Normal course of healing. V = $\frac{1}{4}$. L: downward with Rothmund's knife. It was repeatedly attempted to seize the iris with a pair of forceps, but without success. Extraction without iridectomy and cystotomy. Adh.-pl. band. On the second day the upper portion of the iris is somewhat drawn toward the wound, so that the pupil becomes oblong. Discharged on the twenty-second day with V = $\frac{1}{4}$.

8. Cat. arida siliq., strabismus conv., woman, fifty years of age; states to have been very asthenopic in that eye for twenty years. Cat. removed by means of Weber's double hook. Adh.-pl. band. Discharged on the eleventh day. V = $\frac{1}{3}$. Eighteen days after the first operation, strabotomy (the patient complaining of seeing double). Normal recovery.

9. Cat. dur. mat., man. sixty-eight years of age, very myopic. A great quantity of liquefied vitreous together with aqueous oozes immediately after the scleral section (upward with Rothmund's knife). Careful iridectomy. Introduction of spoon twice; vitreous oozes again. Adh.-pl. band. On the fifth day the recent cicatrix bursts. (The patient hurt the operated eye with his finger.) Anterior chamber full of blood. Vomiting four times. On the seventh day wound closed again. On the seventeenth day discharged with V = $\frac{1}{3}$.

10. Cat. mat. accret. o. d., cat. mat. oc. sin.; man, seventy-two years of age, of good general health. Double operation. In both section with Graefe's knife upward. R: extraction within the capsule with Weber's loop. L: laborious expulsion of lens. Adh.-pl. band. Good course of healing in both, except moderate scleral injection. R: V = $\frac{1}{3}$. L: V. = $\frac{1}{20}$. Cat. secd. Duration of healing thirty days.

11. Cat. mat. accret. oc. sin., woman, sixty-six years of age. Iridectomy on the left eye was performed previously on account of occlusion of pupil after iridocyclitis chronica. Section outward with the lance-shaped knife; a new coloboma made; extraction with Graefe's spoon easy. Borated lint. Recovery without irritation. Discharged on the twelfth day, V = $\frac{1}{60}$; dot-like opacities of the vitreous.

12. Cat. zonul. accret. oc. utr., healthy man twenty-five years of age. Iridectomy in both with Arlt's lance-shaped knife downward. L: preparatory. R: extraction within the capsule with Fischer's forceps. Normal course of operation. Adh.-pl. band. Hyphæma. V = $\frac{1}{3}$. Duration of healing eighteen days.

13. Cat. zonul. accret. oc. utr. Fingers are counted with difficulty in nearest proximity. Man, twenty-five years of age. Iridectomy downward in both eyes with Arlt's lance-shaped knife. R: extraction of lens within the capsule without an accident. Adh.-pl. band. On the third day intense hemorrhage into the anterior chamber, which is absorbed on the seventh day. Discharged with V = $\frac{1}{3}$.

14 and 15. Cat. luxat. o. utr. (R : V = $\frac{5}{50}$ ; L : V = $\frac{5}{100}$), woman, forty-five years of age. Double operation. Section downward with Graefe's knife. Extraction of the cataracts easy with Pagenstecher's spoon, without loss of vitreous (!). Adh.-pl. band. Normal course of healing. Eyes on the twelfth day without irritation. When the patient was discharged, fine flaky opacities of the vitreous were observed. R : V = $\frac{5}{40}$. L : V = $\frac{5}{50}$.

16 and 17. Cat. luxat. o. utr. (R : V = $\frac{5}{40}$ ; L : V. = $\frac{5}{100}$), woman, forty-five years of age. Double operation downward with Graefe's knife. Extraction with Pagenstecher's spoon without loss of vitreous of any amount. Adh -pl. band. Course of healing without irritation. On the fifteenth day, on which the patient was discharged, fine flaky opacities of the vitreous were observed. R : V = $\frac{5}{40}$. L : V = $\frac{5}{50}$.

### IV.—*Extraction by a Corneal Flap Section with the So-Called Beer's Knife.*

The old method of a regular corneal flap was almost entirely abandoned in the Munich eye hospital for several years on account of Dantone's statements of the favorable results of the peripherical linear extraction. Prof. von Rothmund (at the Heidelberg Ophthalmological Society, 1874) stated the reasons of returning to the abandoned Beer's method in certain cases. As soon as in the latter half of our decennium the enthusiastical reports about the results of antisepsis in cataract operations became more numerous, von Rothmund even more frequently resorted to the classical flap extraction. The number representing this method is, however, too small to enter again into a closer discussion on its admissibility. Four times (in cat. mat. semid.) Beer's flap extraction upward was performed. V was in two cases $\frac{1}{4}$ and $\frac{1}{6}$, in one $\frac{1}{20}$, and once = $\frac{1}{\infty}$, from occlusion of pupil from iridocyclitic exudation. Once an enormous hemorrhage occurred during the operation with following loss of vitreous; once the expulsion of lens was very laborious, and the corneal flap was very much bent (V = $\frac{1}{20}$). After the two normal operations V = $\frac{1}{4}$ and $\frac{1}{\infty}$. The reactions were: one serous iridocyclitis; two iritis plast. adh. with cat. secd. and (purulent) iridocyclitis, mentioned above, leading to synicesis pupillæ. No

secondary operation was performed. Forty-two times the flap was formed in the lower half of the cornea.

I.—*The General Visual Result.*

26 = — $\frac{1}{10}$; 3 = — $\frac{1}{20}$; 2 = — $\frac{1}{60}$; 8 = $\frac{1}{\infty}$; 3 = 0. Disturbing cat. secd.: 8.

II.—*Age.*

30—40: 2 (— $\frac{1}{10}$)
40—50: 7 (4 — $\frac{1}{10}$; 1 — $\frac{1}{20}$; 1 = $\frac{1}{\infty}$; and 1 = 0)
50—60: 13 (10 — $\frac{1}{10}$; 1 — $\frac{1}{60}$; 1 = $\frac{1}{\infty}$; and 1 =0)
60—70: 14 (9 — $\frac{1}{10}$; 1 = 0; 2 — $\frac{1}{20}$; and 2 = $\frac{1}{\infty}$)
70—80: 4 (4 = $\frac{1}{\infty}$)
not stated: 2 (1 — $\frac{1}{10}$, and 1 — $\frac{1}{60}$).

III.—*Character of Cataract.*

C. mat. . 34: 22 = — $\frac{1}{10}$; 2 = — $\frac{1}{20}$; 1 = — $\frac{1}{60}$; 7 = $\frac{1}{\infty}$; 2 = 0
C. superm. 2: 1 = — $\frac{1}{10}$; — ; — ; — 1 = 0
C. maturesc. 6: 3 = — $\frac{1}{10}$; 1 = — $\frac{1}{20}$; 1 = — $\frac{1}{60}$; 1 = $\frac{1}{\infty}$; —.

IV.—*Course of Operation in General.*

Uncomplicated, 18: 14 = — $\frac{1}{10}$; 3 = — $\frac{1}{20}$; 1 = $\frac{1}{\infty}$; 12 norm. and 6 disturbed courses of healing.

Complicated (19 mat., 3 maturesc., 2 hypermat.), 24: 12 = — $\frac{1}{10}$; 2 = — $\frac{1}{60}$; 7 = $\frac{1}{\infty}$; 3 = 0; 8 norm. and 16 disturbed courses of healing.

V.—*Course of Operation in Special.*

1. Later iridectomy = 8: 5 = — $\frac{1}{10}$; 1 = — $\frac{1}{60}$; 1 = $\frac{1}{\infty}$; and 1 = 0; 5 times course of healing good, and 3 times disturbed.

2. Laborious expulsion of lens = 7: 4 = — $\frac{1}{10}$; 1 = — $\frac{1}{60}$; 2 = $\frac{1}{\infty}$; 2 times good, and 5 times disturbed course of healing.

3. Rapid expulsion of lens = 2: in both V = $\frac{1}{\infty}$ and disturbed course of healing.

4. Introduction of instruments (2 with complic.), 7: 3 = — $\frac{1}{10}$ (1 complic. instr.); 2 = $\frac{1}{\infty}$; 2 = 0 (1 complic. instr.); 1 good, and 6 disturbed courses of healing.

VI.—*Course of Healing in General.*

Uncomplicated, 20: 16 = — $\frac{1}{10}$; 2 = — $\frac{1}{60}$; 1 = — $\frac{1}{20}$; and 1 = $\frac{1}{\infty}$,

Complicated, 22: 10 = — $\frac{1}{10}$; 2 = — $\frac{1}{20}$; 7 = $\frac{1}{\infty}$; 3 = 0.

VII.—*Course of Healing in Special.*

| | | |
|---|---|---|
| 1. | Tardy closure . . . . | 2 ($-\frac{1}{10}$) |
| 2. | Iritic irritation . . . . | 1 ($-\frac{1}{20}$) |
| 3. | Incarceration of iris . . . | 2 ($-\frac{1}{10}$ and $-\frac{1}{20}$) |
| 4. | Cystoid scar . . . . | 1 ($-\frac{1}{10}$) |
| 5. | Swelling of remnants of lens . | 1 ($-\frac{1}{10}$) |
| 6. | Irit. pl. adh. part. . . . . | 3 ($-\frac{1}{10}$) |
| 7. | Irit. pl. adh. c. cat. secd. . . | 2 ($-\frac{1}{10}$ and $\frac{1}{\infty}$) |
| 8. | Iridocycl. adh. total. . . . | 4 ($\frac{1}{\infty}$) |
| 9. | Iridocapsulit. . . . . | 2 ($-\frac{1}{10}$ and $\frac{1}{\infty}$) |
| 10. | Keratit. purul. . . . . | 4 ($1\frac{1}{\infty}$ and $3 = 0$). |

VIII.—*Kind of Operation.*

Single operation in one sitting, 26 ($17 - \frac{1}{10}$; $2 - \frac{1}{20}$; $5\frac{1}{\infty}$; $1 - \frac{1}{60}$; and $1 = 0$).

Double operation in one sitting, 16 ($9 - \frac{1}{10}$; $3\frac{1}{\infty}$; $2 = 0$; $1 = -\frac{1}{20}$; and $1 = -\frac{1}{60}$).

(Always only one eye operated upon according to Beer.)

IX.—*Dressing in Uncomplicated Course of Operation.*

| | | |
|---|---|---|
| 1. | Adhesive-plaster bandage | 10 ($9 = -\frac{1}{10}$; $1 = -\frac{1}{20}$) |
| 2. | Compressive-roller bandage | 1 ($1 = -\frac{1}{10}$) |
| 3. | Lister's bandage . . | 5 ($3 = -\frac{1}{10}$; $1 = -\frac{1}{20}$; $1 = \frac{1}{\infty}$) |
| 4. | Borated-lint bandage . | 2 ($1 = -\frac{1}{10}$; $1 = -\frac{1}{20}$). |

The five complications, given above (three conj. catarrh, one blepharophimosis, one entropium), did not exercise a direct influence upon the course of healing (five times disturbed) and the visual result (three good, two bad results). In fifteen cases an extraction was successfully performed on the other eye. The operations on the second eye were less favorable; they gave thirteen good and two bad results. In the eleven cases, which could be examined again later, the vision, ascertained at the beginning, had markedly improved. Secondary operations were performed in three cases of cat. secund. with good result (discisio per scleram—two, one month after the first operation; one, three months after the first operation).

CASES.

1. Cat. mat. oc. sin., man, fifty-seven years of age. On the first attempt to extract the cataract, the conjunctiva was ruptured

wherever it was seized. The operation therefore had to be postponed. Fourteen days later extraction. Section rendered difficult on account of the sunken globe. Iridectomy required for repeated prolapses of iris, otherwise normal course of operation. Salicyl. bandage. Closure of wound without irritation. Discharged on the twelfth day with V = $\frac{1}{6}$.

2. Cat. mat. oc. sin., woman, fifty-four years of age. The expulsion of cataract is successful after iridectomy, otherwise the operation normal. Adh.-pl. band. On the second day of the recovery, violent pain; on the third day, purulent infiltration of the wound; then keratitis purulenta, terminating into phthisis bulbi. Discharged on the forty-fifth day with V = o.

3. Cat. dur. mat. oc. utr., man, fifty-seven years of age. Good general health. Double operation. R: according to Graefe upward with Graefe's knife. Course of operation and healing perfectly normal. Adh.-pl. band. V = $\frac{1}{2}$. Duration of healing thirteen days. L: section with Beer's knife downward. The lens can be extracted only after excision of iris. Adh.-pl. band. Iritis. purul., terminating in occlusion of pupil. V = $\frac{1}{\infty}$. Forty-two days after the operation, iridectomy upward and outward; hyphæma. V = $\frac{1}{60}$.

4. Cat. dur. supermat. oc. utr., man, fifty years of age. Good general health. Double operation. L: section with Rothmund's knife upward. Normal operation; course of healing without irritation. V = $\frac{1}{3}$. Adh.-pl. band. Duration of healing thirteen days. R: extraction according to Beer. A small loose piece of cataract removed with Daviel's spoon; otherwise normal course of operation. Adh.-pl. band. On the third day, pain; on the fourth day, annular abscess of cornea; extensive keratitis purulenta, terminating in phthisis bulbi. V = o. Discharged on the fifty-first day.

5. Cat. mat. oc. utr., woman, seventy years of age, apparently healthy. Double operation. R: extraction according to Graefe with Graefe's knife upward; repeated iridectomy. Adh.-pl. band. Iritic irritation. V = $\frac{1}{4}$. L: according to Beer. The patient very restless; the cataract cannot be entirely removed despite repeated application of Daviel's spoon. Adh.-pl. band. On the fourth day purulent infiltration of the wound. Panophthalmia V = o. Discharged on the thirty-fifth day.

6. Cat. mat. oc. d., a woman, seventy-four years of age, apparently healthy. Operation perfectly normal. Lister's bandage.

Patient very restless, pulls constantly at the bandage. On the fourth day rupture of wound by intense squeezing of the lids; further on iritis adhæsiv. total., ending in synices. pupillæ. V = $\frac{1}{\infty}$. Discharged on the fortieth day.

7. Cat. dur. mat., healthy man, sixty-two years of age. A few years ago operated upon on the other eye, according to Beer, with good result. Extraction after recovery from a conjunctival catarrh of which he had been suffering. Operation normal. Course of healing without irritation until the tenth day, on which rupture of the wound occurred from a hurt. On the fourteenth day anterior chamber restored. On the eighteenth day the wound firmly closed. V = $\frac{1}{2}$. Discharged on the twenty-second day.

8. Cat. mat. oc. d., a woman, sixty-seven years of age. Laborious expulsion of lens. A small piece of iris remains in the wound. Lister's bandage. On the fourth day prolapse of iris into the wound. On the ninth day partial keratitis purulenta. Pupil covered with purulent exudation; later on the prolapsed portions of the iris exfoliate. Cornea is clearing up. Discharged V = $\frac{1}{\infty}$. Synice. pup. on the twenty-fifth day.

9. Cat. dur. mat. oc. d., perfectly healthy man, seventy-two years of age. Cat. mat. oc. sin. Double operation. R: extraction according to Graefe upward with Graefe's knife. Rapid expulsion of lens. Secondary hemorrhage and cat. sec. Adh.-pl. band. V = $\frac{1}{\infty}$. Fifty-four days after the first operation, discis. per scler. V = $\frac{1}{6}$. L: extraction downward according to Beer. A small remnant is extracted with the spoon, otherwise normal operation. Adh.-pl. band. Course of healing without irritation until the sixteenth day, then hyphæma; on the thirty-third day, relapsing more intensely; on the forty-third day both pupils obstructed by cat. secd. V = $\frac{1}{\infty}$. Fifty-four days after the first operation iridectomy downward and inward. Hyphæma. V = $\frac{1}{\infty}$. Six months after the chief operation cornea leucomatous in its lower third. Occlus. pup. V = $\frac{1}{\infty}$.

The visual results are remarkable. They are much inferior to the general result (vide *antea*). Especially the bad results form nearly the double number (26.2: 13.8), among those 7.1% clear losses against 4.8% of the general table. Even the good numbers are by 10% behind, the middle ones showing no great difference. We find the cause of it in the complicated course of operation, includ-

ing nearly the whole number of failures. As, however, the percentage of it is almost equal to Graefe's, the cause of these high numbers of losses has to be searched for, not as well in the number, as in the degree and the consequences, of the complications. Among these the use of instruments and the laborious expulsion of lens brought about the worst result; even the iridectomy was followed by over 26% failures. The necessity of the iridectomy, abolishing entirely the aim of the flap extraction, the preservation of the round pupil, has to be considered as a grave complication of the operation, as it is only made use of if the expulsion of the lens does not succeed, or if—especially in a too large and too peripherical flaps—the lower portion of the iris has prolapsed into the wound and cannot be readjusted. We find in the course of healing of our forty-two cases 60% iritic processes, terminating into 50% with occlusion of pupil, corresponding to the extensive injuries to which the iris is exposed in Beer's method. In the same manner the number of the destructive processes of the cornea is greatly higher than the corresponding numbers of the scleral extraction.

V.—*Extraction Outward (in the Sclero-Corneal Junction) with Iridectomy, Eventually with Scoop-Extraction (So-Called Modified Critchett's Method).*

In twenty-eight cases Prof. Rothmund made an incision in the temporal part of the sclero-corneal junction with a straight lance-shaped knife, then a middle-sized iridectomy, and, after dividing the capsule with a straight cystotome, expelled the lens by means of two spoons (applying the one upon the medial portion of the cornea, the other one at the posterior edge of the wound). Remaining lens-matter was removed by rubbing (the direction being changed), or, if this was not sufficient, an extraction with Critchett's scoop was done. Von Rothmund hoped to find an indication to this method in cataracta accreta, every unnecessary pressure upon the globe being avoided by performing the operation without speculum—the assistant holding the lids asunder—and by using a pair of fixation-forceps without a spring.

The experience, however, did not verify the expectation that a smaller percentage of the operative complications could be obtained by this procedure, the number of accidents during the operation not remaining behind those of the other later methods of extraction. But, besides this, it has the great disadvantage, that the enlargement of the pupillary area outward causes annoyance from dazzling, deteriorates without doubt the central acuteness of sight, and in fact is the cause, partly at least, of the relatively high number of moderate results in the cases operated upon. Therefore Prof. von Rothmund practises this operation only in cases of traumatic cataract, in which there is suspicion of a lesion of the fossa patellaris being caused by the injury.

The results are grouped as follows:

I.—*General Visual Result.*

28 (7) : 13 (4) = $-\frac{1}{10}$ ; 7 = $-\frac{1}{20}$ ; 2 (1) = $-\frac{1}{60}$ ; 4 (1) = $-\frac{1}{200}$ ; 1 (1) = $\frac{1}{\infty}$ ; 1 = 0 ; disturbing cat. secund.: 8 (2) ; failure in cat. uncompl.: 4,76 %.

II.—*Age.*

1—10 : 6 (2) (3 : $-\frac{1}{10}$ ; 1 : $-\frac{1}{20}$ ; 1 (1) : $\frac{1}{60}$ ; 1 (1) : $-\frac{1}{200}$)
10—20 : 1 (1) : $-\frac{1}{10}$
20—30 : 2 (1 : $-\frac{1}{10}$ ; 1 : $-\frac{1}{20}$)
30—40 : 6 (2) (3 (2) : $-\frac{1}{10}$ ; 2 : $-\frac{1}{20}$ ; 1 : $-\frac{1}{200}$)
40—50 : 1 ($-\frac{1}{10}$)
50—60 : 2 (1 : $-\frac{1}{10}$ ; 1 : $-\frac{1}{60}$)
60—70 : 4 (1 : $-\frac{1}{10}$ ; 2 : $-\frac{1}{20}$ ; 1 = 0)
70—80 : (2) 1 (1 (1) : $-\frac{1}{10}$ ; 1 : $-\frac{1}{20}$)
not stated : 4 (1) (1 : $-\frac{1}{10}$ ; 2 : $-\frac{1}{200}$ ; (1) $\frac{1}{\infty}$).

III.—*Influence of the Kind of Cataract.*

Cat. matur. . . 9 : 6 = $-\frac{1}{10}$ ; 1 = $-\frac{1}{20}$ ; 1 = $-\frac{1}{60}$ ; 1 = 0
Cat. supermat. . 3 : 1 = $-\frac{1}{20}$ ; 2 = $-\frac{1}{200}$
Cat. maturesc. . 3 : 1 = $-\frac{1}{10}$ ; 2 = $-\frac{1}{20}$
Cat. accret. . . 6 : 3 = $-\frac{1}{10}$ ; 1 = $-\frac{1}{60}$ ; 1 = $-\frac{1}{200}$ ; 1 = $\frac{1}{\infty}$
Cat. moll. . . 5 : 2 = $-\frac{1}{10}$ ; 2 = $-\frac{1}{20}$ ; 1 = $-\frac{1}{200}$
Cat. zonular. . 1 : 1 = $-\frac{1}{20}$
Cat. glauc. accret. 1 : 1 = $-\frac{1}{10}$.

### IV.—*Course of Operation in General.*

Uncomplicated, 5 : 3 = $-\frac{1}{10}$ ; 1 = $-\frac{1}{200}$ ; 1 = $-\frac{1}{600}$

Complicated, 23 (7) : 10 (4) = $-\frac{1}{10}$ ; 6 = $-\frac{1}{20}$ ; 1 (1) = $-\frac{1}{600}$ ; 4 (1) = $-\frac{1}{2000}$ ; 1 (1) = $\frac{1}{\infty}$ ; 1 = 0.

### V.—*Course of Operation in Special.*

1. Complicat. iridectomy = 1 : 1 = $-\frac{1}{2000}$. Course of healing disturbed, 1.

2. Laborious expulsion of lens = 1 : 1 = $-\frac{1}{10}$. Course of healing good, 1.

3. Rapid expulsion of lens = 1 : 1 = $-\frac{1}{20}$. Course of healing disturbed, 1.

4. Corpus vitreum = 2 : 2 = $-\frac{1}{10}$. Course of healing good, 1 ; disturbed, 1.

5. Corpus vitr. with instuments = 7 (3) : 2 (1) = $-\frac{1}{10}$ ; 2 = $-\frac{1}{20}$ ; 1 (1) = $-\frac{1}{600}$ ; 1 (1) = $-\frac{1}{2000}$ ; 1 = 0. Course of healing disturbed, 1.

6. Instruments = 10 (4) : 5 (3) = $-\frac{1}{10}$ ; 2 = $-\frac{1}{20}$ ; 2 = $-\frac{1}{2000}$ ; 1 (1) = $\frac{1}{\infty}$. Course of healing good, 7 ; disturbed, 3.

7. Instruments with complications = 1 : 1 = $-\frac{1}{20}$. Course of healing disturbed, 1.

### VI.—*Course of Healing in General.*

Uncomplicated, 15 (5) : 9 (4) = $-\frac{1}{10}$ ; 3 = $-\frac{1}{20}$ ; 3 (1) = $-\frac{1}{2000}$.

Complicated, 13 : 4 = $-\frac{1}{10}$ ; 4 = $-\frac{1}{20}$ ; 2 = $-\frac{1}{600}$ ; 1 = $-\frac{1}{2000}$ ; 1 = $\frac{1}{\infty}$ ; 1 = 0.

### VII.—*Course of Healing in Special.*

1. Tardy closure . . . 1 : 1 = $-\frac{1}{10}$
2. Iritic irritation . . . 2 : 1 = $-\frac{1}{10}$ ; 1 = $-\frac{1}{20}$
3. Incarceration of iris . . 1 : 1 = $-\frac{1}{10}$
4. Second. hemorrh. after cat. sec. 1 (1) : 1 (1) = $-\frac{1}{2000}$
5. Irit. adhæs. part. . . . 2 : 1 = $-\frac{1}{10}$ ; 1 = $-\frac{1}{600}$
6. Irit. plast. com. cat. sec. . 1 : 1 = $-\frac{1}{20}$
7. Iridocyclit. serosa after cat. sec. 2 : 1 = $-\frac{1}{20}$ ; 1 = $-\frac{1}{600}$
8. Iridocapuslitis . . . 1 : 1 = $-\frac{1}{20}$
9. Iridocyclit. adhæs. total. . 1 (1) : 1 (1) = $\frac{1}{\infty}$
10. Keratitis purulent. . . 1 : 1 = 0.

### VIII.—*Kind of Operation.*

Simple operation in one sitting 22 : 10 = $-\frac{1}{10}$ ; 7 = $-\frac{1}{20}$ ; 2 = $-\frac{1}{600}$ ; 2 = $-\frac{1}{2000}$ ; 1 = $\frac{1}{\infty}$.

Double operation in one sitting 6 : 4 = — $\frac{1}{10}$; 2 = — $\frac{1}{200}$; 1 = 0.

IX.—*Dressing in Uncomplicated Course of Operation.*

| | | |
|---|---|---|
| 1. Adhesive-plaster bandage | . | 1 : 1 = — $\frac{1}{60}$ |
| 2. Compressive-roller bandage | . | 3 : 2 = — $\frac{1}{10}$; 1 = — $\frac{1}{20}$ |
| 3. Borated-lint bandage | . . | 1 : 1 = — $\frac{1}{10}$ |

The four complications, given above (one conj. catarrh, two macula corneæ with synechiæ, and one distichiasis), did not exert a direct influence upon the process of healing (two times disturbed) and the visual result (three good and one unfavorable results). Once the extraction had been performed previously on the other eye, with the same good result, as in the eye operated upon later. In eight cases the eye operated upon was examined again, and an improvement of the vision was observed in all. Operation for cat. secund. was performed only twice by discisio per scleram with good result (once, one month after the first operation; and once, three months after the first operation).

CASES.

1. Cat. gyps. oc. s., healthy woman, fifty-two years of age. After excision of the prolapsed portion of iris, the expulsion of lens is attempted with Graefe's spoon. The lens becomes dislocated into the anterior chamber. Enlargement of the wound by means of curved scissors, then the extraction with Graefe's spoon is successful, but not without great loss of vitreous. Adh.-pl. band. Iridocyclitis serosa. Discharged on the seventeenth day with V = $\frac{1}{60}$.

2. Cat. zonular. oc. utr., boy, ten years of age. L : discisio per corn. three months ago. Patient very restless, has to be placed under the influence of chloroform; after the section vitreous and cortical matter ooze. Compressive roller. Recovery under slight ciliary irritation. V = $\frac{1}{4}$. Discharged on the fifteenth day.

3. Cat. accret. glaucomat. o. d., woman, seventy-one years of age. Glaucoma abs. o. s. V = 0, for three years. At that time glaucom. attack in the right eye. Extraction of the cataract within the capsule is done easily with Fischer's forceps. (The cataract was shrunken, as it was noticed after the iridectomy.) Moderate loss of vitreous. Adh.-pl. band. On the sixth day

hemorrhage into the anterior chamber. Discharged after seventeen days. V = $\frac{1}{20}$.

4. Cat. moll. o. s., cat. moll. progr. o. d.; a woman, twenty years of age, perfectly healthy. L: wound, made by lance-shaped knife, lies half within the cornea. After the iridectomy the lens proves to be shrunken. Very small cataract. Upon pressure (after cystotomy) the iris bursts; a portion extracted with the spoon. Prolapse of vitreous of the size of a pea, removed with the scissors. Adh.-pl. band. On the twenty-seventh day eye without irritation, with a black hole in the centre of the pupil. V = $\frac{1}{10}$. Seven months later discis. per scler. V = $\frac{1}{2}$.

5. Cat. moll. o. d., a girl, seventeen years of age. L: leucoma adh.; cat. gyps. c. amaur. Complicated iridectomy. The scleral edge remained and was excised after the extraction of the soft cataract. Black pupil. Adh.-pl. band. On the fifth day hyphæma, filling the whole chamber on the ninth day, and removed by paracentesis on the eleventh day. Hyphæma returns on the thirteenth day (absorbed on the 15th). On the twenty-first day discharged with a slightly opaque pupil. V = $\frac{1}{200}$. Cat. secd. Discisio per scler. three months later. V the same. Ophthalmoscopical condition negative.

## VI.—*Extraction of Cataract after Preliminary Iridectomy.*

This method is represented in our statements by a proportionately small number of cases, just as with the extraction within the capsule. It was only after the latest important communications of Förster, that it was adopted as a more frequent operation—(twenty-one cases have thus been operated upon with most favorable results since the publication of our report). During the time covered by our statements it was exceptionally performed, especially in cases of doubtful or unfavorable prognosis (in a high degree of marasmus or myopia, under suspicion of chronic choroidal affections), and not unfrequently, when the course of operation was very complicated, even in the first steps (deviation of the knife, caused by sudden movements of the eye; abundant hemorrhage into the anterior chamber, excessive excitement and restlessness of the patient). The operation was invariably distributed over two sessions in those not very frequent cases, in which the restoration of sight depends upon the

favorable result of only one extraction (in amaurosis of the other eye).

Von Rothmund, like other operators, has extended the interval between preliminary and chief operation during the last few years, four to five weeks being now the minimum. Preliminary cystotomy was never performed, according to Mooren, who recommends its performance between iridectomy and extraction. On account of our limited material we have to abstain from answering the question, how far the expectations from the preliminary iridectomy are proven by facts, as we did, considering Pagenstecher's extraction; the more, as the sixty-three numbers we have resort to were composed of cataracts of heterogeneous characters, and the chief operation was performed in five different ways. It would be very rash to conclude, from the proportionately high number of failures, that the preliminary iridectomy was not legitimate. There might be in our cases more reason to think the number of losses might have been much higher, if the operation were not divided over two sessions. We add, that in a small number of cases the iridectomy did not directly point to an extraction afterward, but was only performed previously, in order to remove a circular adhesion of the pupillary margin to the anterior capsule. Cataract developed after years, and it was most natural to make use of the existing coloboma in order to extract the cataract.

VII.—*Course of Healing in Special.*

1. Severe conjunctiv. . . 2 : 2 = $-\frac{1}{10}$
2. Tardy closure of wound . 1 ; 1 = $-\frac{1}{10}$
3. Irit. irritation . . . 1 (1) : 1 (1) = $-\frac{1}{10}$
4. Incarcetation of iris . . 1 : 1 = $-\frac{1}{10}$
5. Incarceration of iris c. cat. secd. 1 : 1 = $-\frac{1}{10}$
6. Irit. pl. adh. part. . . 3 : 2 = $-\frac{1}{10}$; 1 = $-\frac{1}{20}$
7. Irit. pl. c. c. s. . . . 11 : (3) : 2 = $-\frac{1}{10}$; 2 (2) = $-\frac{1}{20}$; 4 = $-\frac{1}{60}$; 1 (1) = $-\frac{1}{200}$; 2 = $\frac{1}{\infty}$
8. Cat. s. with after-hemorrh. 4 (2) : 3 = $-\frac{1}{60}$; 1 (1) = $-\frac{1}{300}$
9. Iridoc. adh. tot. . 2 (2) : 1 (1) = $\frac{1}{\infty}$; 1 (1) = o
10. Marginal keratit. . 1 : 1 = $-\frac{1}{20}$
11. Panophthalmia . 4 (1) : 4 (1) = o
12. Erysipel. fac. . . 1 : 1 = o.

The complications in the operated and other eye—fifteen in total—were without essential influence upon the course of healing and the visual result. (Conj. cat. chron. eight: recovery disturbed seven, failures three; irido-chorioiditis of the other eye two: course of healing and result favorable; Blepharophimosis one: course of healing disturbed, success; nystagmus one: course of healing disturbed, success; one myopia: course of healing disturbed, failure; one strabismus: course of healing disturbed, failure; one synechia ant.: course of healing disturbed, success.) Thirteen times extraction of cataract was performed in one eye, with seven good and six bad results; in the second eye, ten good results, one medium, and two failures. In ten cases operated upon and examined later, the sight had improved or remained the same. There were eight secondary operations: five were performed one month post operat. I., and three three months post extract.

The secondary operations in simple cat. sec. gave two good results by discis. per scler. (2), one good result by iridectomy (1). In cat. secd. accreta discision per scler. in three cases was followed once by a good result, and twice by failure; iridectomy, performed twice, by one success and one failure.

CASES.

1. Cat. zonular. oc. utr., a healthy girl, nineteen years of age. Six weeks previous to extraction, iridectomy, right, as preliminary operation. Nystagmus renders the section difficult (outward with lance-shaped knife). Course of operation complicated by repeated introduction of instrument (Graefe's spoon, Weber's double hook). Adh.-pl. band. Two days p. o., heavy pain in forehead and very great photophobia; iritic irritation of long duration. Discharged on the eightieth day with V = $\frac{5}{200}$. Cat. secd. Six months p. op., disc. cat. secd. without result of any amount.

2. Cat. accret. oc. d., woman, seventy-two years of age. Iridectomy in both eyes, one month previous to the extraction. L: on account of glaucoma imminens. R: as preliminary operation. Section upward with Graefe's knife. Extraction with the double hook. Cortical remnants removed with Graefe's spoon. Adh.-pl. band. Course of healing without irritation until the sixth day, then irit. plast. cum. cat. secd. Discharged with V = $\frac{1}{50}$ on the twentieth day.

3. Cat. mat. accret. oc. d., man, sixty-five years of age. Blepharophimosis oc. sin. Iridectomy was performed as preliminary operation five weeks before the extraction, canthoplasty three weeks previous to that. Section with Graefe's knife downward. Normal course of operation. Salicylated jute. Irit. plast. cum cat. secd. Discharged on the thirtieth day with V = $\frac{5}{20}$.

4. Cat. supermat. oc. sin., girl, twenty years of age. Severe nystagmus. Iridectomy had been performed eight months previously. Section downward with Graefe's knife. On pressure upon the cornea the lens came away suddenly with $\frac{1}{4}$ corpus vitr. Tight compressive-roller. Course of healing favorable, but great conjunctival injection. V = $\frac{1}{60}$. Cat. secd. Discharged on the forty-first day.

5. Cat. mollis. accret. oc. sin., delicate girl, nineteen years of age. Irit. chron. (pupillary exudation). Iridectomy four weeks previous to the extraction. Course of operation and healing normal. Section with Rothmund's knife downward. Operation normal. Course of healing disturbed by a moderate hyphæma. On the twenty-second day discharged with V = $\frac{1}{300}$. (Occlusio pupillæ part.) Four months later iridectomy outward with straight lance-shaped knife. V = $\frac{1}{15}$.

6. Cat. zonular. accret. oc. s., man, twenty-five years of age. Coloboma irid. artif. performed previously, on account of chronic iritis. The patient's right eye had been successfully operated upon three weeks previously according to Pagenstecher. (V = $\frac{1}{8}$.) L: extraction outward with lance-shaped knife. Cat. extracted with Critchett's spoon. Adh.-pl. band. Recovery without irritation. Cat. secd. V = $\frac{1}{20}$.

7. Cat. mollis accret. oc. d., man, thirty-eight years of age. Coloboma irid. artif. Section with Rothmund's knife downward. Expulsion of lens rendered difficult by adhesions. Graefe's spoon. Adh.-pl. band. Course of healing without reaction of any amount. Pupil entirely covered with blood. V = $\frac{1}{200}$. Discharged on the tenth day.

8. Cat. polar. post. oc. utr., woman, fifty-nine years of age. Both eyes very myopic. Iridectomy had been performed two months previously. Extraction upward o. d., according to Graefe. Profuse conjunctival hemorrhage. Coagula removed with a pair of forceps. Remnants of lens remaining. Borated lint. Irit. plastic. cum cat. secd. V = $\frac{1}{200}$. Discharged on the twentieth day.

9. Cat. accret. oc. d., woman, forty-seven years of age. Iridochorioiditis. Synicesis pup. (V = o) oc. sin. Iridectomy two months before extraction. Section downward with Graefe's knife. Synechiæ separated with a spatula. Lens extracted with Graefe's knife. Prolapsus corp. vitr. Compressive roller. Recovery with moderate conjunctival irritations. V = $\frac{1}{20}$. Cat. secd. Discharged on the thirty-third day.

10. Cat. accret. oc. sin. V = $\frac{1}{\infty}$. Woman, thirty-eight years of age. R : V = $\frac{6}{200}$ (opacities of vitreous). Six months ago iridectomy performed on both eyes for occlusion of pupil. Section downward with Graefe's knife. Some thickened remnants of capsule remain: Adh.-pl. band. Hæmophthalm., irit., iridocapsulitis. V = $\frac{1}{\infty}$. Three weeks later, iridectomy with straight lance-shaped knife. Occlusion of pupil. V = $\frac{1}{\infty}$.

11. Cat. accret. oc. d., woman, sixty-seven years of age. Iridectomy performed two months previously. Section with Graefe's knife upward. Considerable hemorrhage into the anterior chamber. Lens extracted within the capsule by means of Pagenstecher's spoon. Moderate loss of corp. vitr. Borated lint. The patient complains of violent pain in the afternoon ; in the next days sero-hemorrhagic secretion. Otherwise normal course of healing. V = $\frac{1}{3}$. Discharged on the fifteenth day.

12. Cat. mat. o. d., cat. incip. o. s., and irit. plast. o. d. (fingers in two feet); man, sixty-five years of age. After extraction of the right cataract downward with Rothmund's knife, in the same section, iridectomy downward in the right eye as an antiphlogistic. Fourteen days later, extraction downward, the lens apparently coming out entirely. Adh.-pl. band. On the fourth day cat. secd. but recovery without irritation. V = $\frac{1}{200}$. R E : course of healing without irritation, but incarceration of a small piece of iris. V = $\frac{1}{\infty}$.

13. Cat. immatur. oc. d., girl, twenty-nine years of age. Slight deposits on the capsule. Iridectomy performed one month previously. Extraction upward with Graefe's knife. The patient very restless. A great deal of cortical substance has to be left behind, on account of great ocular tension. Borated lint. Course of healing normal. Pupil obstructed by cat. sec. V = $\frac{1}{\infty}$. Four weeks later discis. of cat. sec. V = $\frac{3}{5}$.

14. Cat. immatur. oc. utr., man, fifty-six years of age. Conjunctiv. cat. The preparatory iridectomy precedes the extraction by two months. Section with Graefe's knife upward. After

introduction of the speculum profuse hemorrhage into the anterior chamber. A small remnant of lens is left behind. Borated lint. Iritis plastica cum cat. sec. V = $\frac{1}{20}$. Discharged on the twentieth day.

15. Cat. mat. oc. d., man, fifty-nine years of age. Iridectomy one month previously. Extraction downward, according to Pagenstecher. The lens presses firmly against the edges of the wound. Extraction of cataract with Graefe's spoon; loss of $\frac{1}{3}$ of corp. vitr. Adh.-pl. band. Wound closed on the fifth day. Recovery without irritation. V = $\frac{5}{10}$. Ophthalmoscopic examination reveals some opacities of the vitreous.

16. Cat. accret. oc. d., woman, seventy-five years of age. Good general health. The patient's other eye was successfully operated upon after Mooren's method, 2½ years ago. Section upward with Graefe's knife. Wound has to be enlarged with bent scissors. Prolapse of vitreous. Since the lens could not be expelled, even after three attempts, the operation was postponed and repeated after fourteen days. Opening of the cicatrized wound with Graefe's knife. Nucleus easily extracted with spoon. In removing the cortical substance, hernious prolapse of vitr. and profuse conjunctival hemorrhage. Borated lint. On the fourth day of the course of healing, grayish infiltration of the edges of the wound. Iris discolored. On the eighth day the upper part of the wound sloughed. Purulent infiltration of vitreous. Keratitis purulenta. V = o. Discharged on the twenty-first day with borated applications.

17. Cat. mat. accret. colob. irid. artif.; man, thirty-six years of age. Section upward with Graefe's knife. Cataract removed with Weber's double hook. Cortical substance removed by rubbing. Vitreous protruded into the wound like a hernia without any loss. Compressive roller. Course of healing without irritation. V = $\frac{1}{30}$. Discharged on the tenth day.

18. Cat. mat. oc. d. Colob. irid. artif., man, seventy years of age, of good general health. Section upward with Graefe's knife. Operation rendered very difficult by the restlessness of the patient. Enlargement of the wound with the bent scissors. Lens extracted with Graefe's spoon, causing a severe contusion of the cornea. Borated lint. Toward evening violent pain set in, so that the patient screamed. On the first day considerable swelling. On the second day purulent infiltration of the wound, terminating in keratitis purulenta and panophthalmia. V = o. Discharged on the thirtieth day.

19. Cat. mat. accret. oc. utr., an apparently healthy woman, seventy-two years of age. Preliminary iridectomy in both eyes. R.: operation and course of healing normal. Extraction of right cataract. One month later section downward with Rothmund's knife. Prolapse of fluid vitreous. Extraction of lens with a spoon. Graefe's bandage. Violent pain on the next day. Hypopyon. Further on keratitis purulenta. Phthisis bulbi. V = o. Discharged on the forty-fourth day.

20. Cat. mat. oc. sin., colob. irid. artif.; a man, æt. eighty-five, of deficient mental ability. Section upward with Graefe's knife rendered difficult on account of the deep-seated eye. Whilst removing the cortical substance, prolapse of vitreous. Extraction with Graefe's spoon. Borated lint. Patient very restless; gets up without permission. After some days, enormous swelling and conjunctival secretion. Purulent infiltration of the wound and vitreous, terminating in phthisis bulbi. Discharged on the twenty-seventh day with V = o.

21. Cat. mat. oc. d., an apparently healthy man, sixty-six years of age. Synicesis pup. oc. sin. Iridectomy three weeks previously. Extraction according to Pagenstecher. Section outward with the straight lance-shaped knife. Lens removed within the capsule, without any further complication. Graefe's bandage. Wound closed on the fourth day. Conjunctiva very little injected. Pupil large and black. V = $\frac{1}{\infty}$. On the next day facial erysipelas is observed after removing the bandage. After its decline, V = o.

The results of the remaining methods of operation may be discussed only in brief, as they cannot be well classified, and are of no statistical value on account of their small number, and are only of interest as individual cases. Four out of five patients operated upon exactly according to Wecker's method, were discharged with V = $\frac{1}{6}$ to $\frac{1}{10}$; only once was the result moderate on account of secondary cataract, adherent to the pupillary margin. V = $\frac{1}{40}$. The course of operation in this case was complicated by introduction of instruments, prolapse of vitreous, and incomplete removal of lens. The other complications were: an abnormal iridectomy, an enlargement of the section with a bent scissors, and a tardy expulsion of the lens. The course of healing exhibited only little iritic irritations, once

combined with incarceration of iris, once with a small secondary cataract; in one case, operation and healing were perfectly normal, so that the patient could be discharged after eight days.

The concave section, with Jaeger's lance-shaped knife, was twice attempted with unequal result. In the first case, the operation, disturbed by a profuse hemorrhage, was followed by a severe iritis, keeping up a state of irritation for a long time; the visual result was, however, good. In the other case, the lens could be removed upon pressure with a probe, but remaining cortical substance required repeated introduction of the spoon in order to cleanse the pupil tolerably. After removal of the bandage on the fourth day, there was purulent infiltration of the wound-edges, with subsequent intense iridokeratitis purulenta. Thirty days after the operation, the pupil was closed by exudation; the whole cornea was flattened and slightly opaque, with numerous vascular patches in its upper marginal portion. The sight had entirely disappeared.

A very good result was obtained from two extractions with the lance-shaped knife, downward. The first was a patient, twenty-eight years of age, suffering from diabetes mellitus, who had always been myopic. Operation and course of healing were perfectly normal. After fifteen days the patient left the institution with $V = \frac{1}{2}$. The second operation turned out in the same way. The patient was a young man, twenty-one years of age, with cataracta mollis, complicated by leucoma adherens, oozing as a milky matter right after cystotomy: the course of healing (Lister's dressing) was without irritation; after twelve days, most of the remnants were absorbed; sight $= \frac{1}{8}$.

Extraction per scler. inward was performed with the lance-shaped knife in a man seventy years of age; expulsion of lens, tardy; upon the attempt to facilitate its expulsion by pressure with the spoon, the fossa patellaris burst and some vitreous oozed, right after removing some blood coagula; adh.-pl. band, On the third day, the patient complained of pain, and there was a purulent infiltration of the

wound, in short time extending over a tongue-shaped portion of the cornea. The keratitis declining by and by, the accompanying iridocyclitis progressed and occluded the pupil entirely by exudations. Thirty days post op., discharged with $V = \frac{1}{\infty}$.

It happened three times in the last fifteen years, that the **aim of the extraction was frustrated** by the dislocation of the lens into the vitreous. In one of these cases, in a man sixty-eight years of age, with cat. mat. (section downward with Rothmund's knife), the operation was rendered very difficult by an unusually profuse hemorrhage into the anterior chamber. Upon pressure, the lens became dislocated downward and backward. On the attempt to extract the lens with Pagenstecher's spoon, it went still deeper and could not be extracted. Black pupil. Adh.-pl. band. On the second day, the edges of the wound infiltrated with pus, pupil covered with considerable amount of yellowish-gray exudations. Later on, phthisis bulbi. In the second case, cat. mat. (man, sixty-nine years of age, with pterygium), an upward section was performed with Graefe's knife. Pressure and rubbing did not bring about the expulsion of the lens. Introduction of the spoon causes considerable loss of vitreous. Even with repeated introduction of the spoon the lens could not be removed. After the third introduction the lens was dislocated into the vitreous. Borated lint. At first, apparently normal course of healing, On the fifteenth day, eye only a little irritated. The cataractous lens is now seen to oscillate, being partly held in place by a remnant of the zonula. $V = \frac{1}{12}$; two weeks later, lingering iridocyclitis with pupillary exudations and phthisis bulbi. $V = 0$.

The third case was cat. mat. o. s., in a man fifty-seven years of age; a preparatory iridectomy had been performed three weeks previously. Section upward with Graefe's knife, too small; has to be enlarged with curved scissors. Upon repeated pressure, cortical substance and fully $\frac{1}{4}$ of the vitreous oozed out of the wound. The nucleus passed out of reach and could not be extracted. Adh.-pl. band. Following this, heavy pain for some days.

Hypopyon. Cat. secd. connected with the pupillary margin. Discharged on the thirtieth day, with $V = \frac{1}{40}$. (Cat. secd. The details of the fundus cannot be recognized).

Of *sympathetic* (?) affections, neuritis optica was once observed. The left eye of a woman, fifty-five years of age, had been successfully operated upon for cat. mat. one year previously. Six months post extr., the patient noticed that the sight in the eye operated upon deteriorated, and she returned to the institution some weeks later. There was a slight cat. secd. punctata, unusually dense in its central parts. Disc. p. corn., with an English needle. The day after, grayish infiltration of the corneal puncture. In the evening, the patient complains of severe pain in her eye. Bandage removed; infiltration of wound greater; hypopyon 1 *mm.* high. Iris discolored, pupil narrower. The iritic symptoms increased more and more, the vitreous became very hazy, and, four weeks later, she could only discern light from dark. Extensive detachment of the retina in its lower half (?). The patient was discharged five weeks post disc., but returned after fourteen days, stating that the other eye began to fail, and that she had suffered from photophobia for several days. O. S.: neuritis optic., disappearing entirely after enucleation of the left eye.

In a man, who was successfully operated upon in both eyes, for cat. mat., a lingering iridocyclitis developed later in the eye last operated upon, extending to the eye first operated upon (no clinical history, since the patient consulted somebody else). The left eye became blind, whereas a small degree of sight is reported to have been preserved in the right eye, affected last.

We have still to add some words upon the idea which underlies this report: In opposition to many attempts—legitimate though they be—to derive important practical consequences from limited statistical results, we have endeavored merely to give a statistical picture of cataract extraction which, viewed from various stand-points, would illustrate the results of the most common methods of operation and the influence of complications, especially in Graefe's linear ex-

traction. It seemed to be premature to make use of this small contribution for extensive practical conclusions. Our aim will be attained, if we can hope that our work may assist later authors in the solution of more general questions of practical interest.

# TWO CASES OF UPWARD STRABISMUS.

By E. L. HOLMES, M.D., of Chicago.

Case 1.—J. W., thirteen years of age, sought my advice regarding a peculiar defect of his right eye, which had existed from early childhood. At intervals of half or three quarters of a minute, whether the patient was reading or unoccupied, the axis of the eye turned quite slowly upward, so that nearly all the cornea was concealed beneath the upper lid. There was no corresponding elevation of the upper lid, and no rotation of the globe from irregular action of the oblique muscles. The movement was involuntary, and yet the patient was conscious of a contraction of the muscle, and to a small degree could control the spasm.

During the intervals the cornea was directed very slightly inward and possibly upward. There had never been a deviation of the head, nor had the patient ever observed diplopia, nor could this be induced by prisms or by any other means. When the eyes were directed downward with the attempt to fix upon a point, the right eye remained slightly higher than the other. On covering the left eye the axis of the right was found to be turned downward to fix the object, the left cornea then turning to a minute extent still further downward.

The vision was perfect for practical purposes, requiring, however, $-\frac{1}{48}$ cyl. 90° to be absolutely so.

There was evidently paresis of the right inferior rectus of the right eye or increased strength of its antagonist in consequence of its abnormal activity. The patient was in good but not robust health, and had never shown symptoms of local or general chorea. I have observed cases in which spasmodic contractions of both levatores and superior recti muscles caused an exceedingly disagreeable appearance—more annoying if possible to friends than

to the young patients themselves. These patients were relieved by arsenic, quinine, and iron.

The cornea, in the case here reported, turned slowly upward, so that one could scarcely compare the movement to the sudden contractions observed in chorea.

A *complete tenotomy* of the superior rectus restored the cornea to its normal position and entirely destroyed the spasms. In this condition of the eye diplopia could not be induced.

At the end of two weeks, however, when the patient left my care, a very slight tendency to spasm could be observed. This disappeared in the course of three months, so that the eye remained in a position almost absolutely perfect.

CASE 2.—C. W., twenty-five years of age, a locomotive fireman, had always enjoyed good health and had never observed any peculiarity in either eye till about two years ago, when the right upper lid began to open more widely than the other, with gradual, increasing upward strabismus. When the patient was much fatigued the pupil was nearly concealed under the lid.

Dec. 18th the patient came to me for advice. There seemed to be perfect concomitant movements of the eyes. In any position the right cornea was considerably higher than the other. This was specially observable when the patient looked directly forward. There was apparently no paresis of any muscle nor spasm of the levator or of the rectus superior. There was no acknowledged specific infection. By no method could diplopia be developed. With $-\frac{1}{18}$ cyl. 180° vision equalled the other normal eye $\frac{8}{VIII}$.

After division of the superior rectus (under the influence of cocaine) the eye was completely restored to its normal position, although the upper lid opened more widely than that of the other side. Four days after the operation, when the patient desired to return home, the result was still perfect.

These two cases occurring in my practice during the present year are the only ones of the kind which have fallen under my observation. The position of the cornea above described, in cases of paralysis and injury, is sufficiently frequent.

# A CASE OF PROLAPSE OF THE VITREOUS THROUGH A NEEDLE-PUNCTURE OF THE CORNEA.

By E. L. HOLMES, M.D., of Chicago.

CASES which have fallen but once under the observation of a specialist in an active experience, extending through more than a quarter of a century, can scarcely fail to present some points of interest to the student of ophthalmology.

Mrs. R., forty-two years of age, apparently in perfect health, rapidly recovered with absolutely no accident from the operation of extraction of hard cataract, which I had performed by the downward section. Nine weeks after this, a very delicate opacity of the posterior capsule, which had been observed soon after the operation, had considerably increased in density, with a corresponding obscuration of vision.

By means of Knapp's needle-knife this membrane was divided with most excellent results as determined immediately after the operation. The puncture was made in the lower part of the cornea, the point of the instrument having been carried upward and backward so that the edge, when advanced and withdrawn, made a large elliptical opening through the capsule. A small amount only of aqueous humor escaped. The patient was kept in bed, with directions that the eye be frequently moistened with a solution of boric acid, and that a drop of solution of atropine be instilled between the lids twice daily. No evidence of approaching trouble was manifest till the fourth day, when the patient complained of a little irritation as if a mote was under the lids. An examination revealed a slight redness of the palpebral conjunctiva and a small amount of mucus on the edge of the

lower lid, which was easily removed, with some relief of the irritation. The boric acid and atropine were continued. The next day the mucus was again removed, when for the first time I observed that a very minute gray filament extended from the puncture down over the surface of the cornea and conjunctiva. As I had never, in a large number of instances, in which I had punctured the cornea, observed such a condition, and as my attention had never been drawn to any especial allusion to the subject in ophthalmic literature, I was greatly interested to determine what this filament was. A careful examination in a good light showed that it was not a portion of the capsule, for this was distinctly seen preserving its plane across the whole pupil increased in size by the previous iridectomy and use of atropine. The recent elliptical, jet-black opening in this membrane was clearly visible. There was simply a minute prolapse of the vitreous. The very comfortable condition of the patient and the fact that I had never had occasion to examine the condition of so small a surgical wound of the cornea, as threatening danger to the eye, will explain why the presence of the prolapse for several days had escaped my attention. It would be difficult to explain why so extensive an incision at the operation for extraction should heal so readily and so slight a puncture heal so slowly.

It is unnecessary to dwell on the fact that minute injuries of the cornea may cause suppurative keratitis and loss of an eye, or may cicatrize only after weeks of irritation, while large wounds with extensive prolapse of the vitreous may heal almost by primary intention.

In the case under consideration did the presence of the vitreous prevent cicatrization of the puncture, or did the failure of the cornea to heal simply permit the continued prolapse? The fact that the needle was introduced very near the cicatrix of the incision for the extraction can scarcely have significance in the case, since I have in a very large number of cases performed the operation for extraction after a preliminary iridectomy, and believe the division of the cicatrix at the final extraction is of little importance.

On the eighth day after the operation vision was still unimpaired. Soon, however, the aqueous humor became cloudy, the vision obscure, the conjunctiva more congested, with considerable

pain. The opacity of the vitreous seemed to commence in the form of a cone extending into the eye, its apex being at the puncture. These symptoms increased in extent so that on the eighteenth day there was considerable chemosis, with great redness and opacity of the intraocular media, with discolored iris and increased pain as in panophthalmitis. The patient could not count fingers. By this time the prolapse had disappeared and the corneal wound had closed, leaving a gray halo one and a half millimetres in diameter around the central darker cicatrix. Boric acid, atropine, duboisia, and subsequently, as the tension had increased, eserine had been used locally—internally, saline cathartics and suitable doses of morphine. At this time the patient entered the Eye and Ear Infirmary, during my temporary absence, and was under the care of Dr. Montgomery. The eserine was continued, as increased tension was a prominent symptom. Small doses of hyd. bichlor. were given internally, followed by quite free inunction for a few weeks. The patient soon began to improve, and at the end of six weeks recovered excellent vision. All the symptoms disappeared, leaving the conjunctiva, iris, and refracting media normal. There is still, however, to be seen a minute filament, slightly conical in shape, extending from the seat of the puncture to the lower angle of the opening in the posterior capsule. I think this delicate nebulous filament is connective tissue in the vitreous and not capsular remains. The eye, which was always very myopic, now enjoys as good vision as before the second operation. $V = \frac{5}{20}$. For four months the eye was very susceptible to light and did not tolerate much use. These symptoms gradually subsided without evidence of recurring inflammation.

# A CASE OF AMBLYOPIA FROM MENSTRUAL HEMORRHAGE IN TYPHOID FEVER; RECOVERY OF SIGHT.

By Dr. CORNELIUS WILLIAMS, St. Paul, Minn.,

FORMERLY ASSISTANT SURGEON AT THE NEW YORK OPHTHALMIC AND AURAL INSTITUTE.

On August 17, 1883, I was asked to see Mrs. L., German, a brunette, slender and of medium height, æt. twenty-two, a patient of Dr. Gottfried Stamm, of this city. She was suffering from typhoid fever; this was the 14th day of the disease. On the 8th day her menses appeared. The quantity of blood, though considerable, was less than usual with her. At about the end of the epoch and in the afternoon it suddenly appeared to her as if every object in the room was illuminated; they glittered as if they were covered with some brilliant sheen; this phenomenon lasted only a few moments, when every thing became dark. The patient supposed that night had suddenly fallen, and remarked the fact to the attendant who informed her that it was still bright daylight. They found her much alarmed, the pupils widely dilated and immovable, and unable to see the hand before her. This dilatation of the pupils gradually disappeared. and when I saw her I found them normal in size and reaction. She could count fingers at two feet with either eye. She could not distinguish the details of any object, and owing to her condition the field of vision was not examined. Ophthalmoscopic examination revealed the discs very white, arteries thread-like, veins in comparison large, though smaller than natural. The retina had a uniformly dim gray reflex, a want of perfect transparency, very much like what I have seen at the moment of death; no hemorrhages.

*August 23d.*—Field of vision complete, intraocular appearances the same, discs whiter, vision not improved by any glass.

*Sept. 5th.*—Arteries larger; retina not yet transparent, appearance similar to that in alcohol; amblyopia; can see better, but cannot distinguish colors; recognizes blue after looking at it intently for some time.

*Oct. 4th.*—Convalescence is almost complete, O. d. not so white; arteries larger than before, yet smaller than normal. She can read ordinary print, but it must be held close to the eye, and cannot read for any length of time. There is a faint white line on each side of the arteries, very dim in some places but still visible.

*Oct. 9th.*—Vision $\frac{1}{15}$. She says vision was improved by the examination of the 4th. She reads the "P" of Green's test-types at eighteen feet; D = 0.6. at 17″, slowly, and with difficulty. D = 0.5. can be read nearer but the effort is painful. The color-perception has returned, though still faint, blue being the first in order to return; in my carpet, which has blue and red flowers, the blue ones were seen at a glance, while the red ones only when the attention was directed to them. Examined with Holmgren's worsteds she correctly sorted the red and green but confounded green and yellow, purple and blue, at first examination, but when her attention was called to the heaps she immediately detected her mistake and corrected it. The vision was $\frac{1}{15}$. She is emmetropic; accommodation still weak.

Dr. Stamm informs me that this patient had taken quinine, though not in excessive quantity—about fifteen grains a day. She says she had marked tinnitus, yet I think it hardly probable that this was a case of quinine amblyopia. There was no scotoma and no diminution of the field of vision, at least when I saw her.

The quinine was continued, yet the patient recovered her vision. There is a certain amount of apparent atrophy of the disc and a corresponding diminution of vision, which may, however, disappear in time. I have not examined the patient for a year and cannot say as to the condition to-day.

Amblyopia produced by hemorrhage from the stomach or bowels is not so rare, amblyopia from metrorrhagia also occurs, but blindness coming from the ordinary menstrual flow must be exceedingly rare, even when there is grave

general disease. In this case there were no hemorrhages from either stomach or bowels.

In what manner a comparatively trifling hemorrhage from certain of the internal viscera produces the lesion of retinal circulation which induces amblyopia or amaurosis, while far more extensive losses of blood from peripheral organs have no such consequence, is in a certain sense a matter of conjecture. It may be supposed that an excitation communicated through the abdominal or pelvic ganglia of the sympathetic to the vaso-motor system, through the ciliary ganglion, might produce tonic contraction of the walls of the retinal arteries, as well as to a lesser extent a contraction of the dilatator of the pupil, if there be such a muscle. These phenomena—the contraction of the arterial coats and the dilatator—we know by clinical observation did occur in this case; yet why this election, is a matter difficult to understand.

In those cases in which the blindness is permanent despite the return of the retinal circulation, it is probable that the lesion is not confined to the intraocular portions of the optic nerve; while in those in which there are no ophthalmoscopic appearances denotive of disease, with retention of the pupillary sensibility to light, the lesion is probably confined to that portion of the brain which presides over visual perception, as held by von Graefe.

# CASES OF TRACHOMA IN THE NEGRO RACE.

By Dr. JAMES L. MINOR,

PATHOLOGIST AND ASSISTANT SURGEON TO THE N. Y. EYE AND EAR INFIRMARY.

DR. S. M. BURNETT'S article on "The Comparative Frequency of Eye-Diseases in the White and Colored Races in the United States," which appeared in the last number of the ARCHIVES OF OPHTHALMOLOGY, brings out the interesting fact that no case of trachoma has been observed in a large number of negroes (1,514) which have been treated at his eye-clinic in Washington. He intimates that the colored race may not suffer from this disease, and with this premise, draws conclusions which may, I think, prove misleading.

I can bear testimony to the accuracy of Dr. Noyes' claim that we have "colored trachoma." We have but few negro patients in N. Y.; and at the N. Y. Eye and Ear Infirmary, where most of my cases have been seen, no attempt is made to keep their records distinct from those of white patients; hence, not knowing the exact number of colored patients treated, I cannot give the percentage of cases of trachoma which I have observed in this race with the same degree of accuracy that Dr. Burnett has done.

I have seen four cases of trachoma in negroes at the N. Y. Eye and Ear Infirmary during the last three years; and I recall another, which was treated at the Brooklyn Eye and Ear Hospital during my house-surgeonship of that institution; and I saw still another, while on a vist to my home in Virginia. I am sure that I never saw more than a hundred negro patients with eye-disease—probably not so many,—yet these have furnished as large a percentage of

cases of trachoma as is usually seen in the white race. I may also state that these cases were *genuine* ones of *true trachoma*, differing in no particular from similar cases in whites. I have no explanation to offer as to the occurrence of trachoma in negroes of the North, and its non-occurrence in the same race in the District of Columbia. The fact of its occurrence, however, proves that *race* has nothing to do with it. And if climatic and other influences are factors in the question, a notable exception is to be found in my last case, who was born and bred in Va., seventy-five miles *south* of Washington. That there is often a dyscrasia associated with trachoma, which requires general medication, is a fact that every ophthalmologist will testify to. Yet there are many cases in which the disease is apparently and practically entirely local—there being no evidence of the slightest constitutional disturbance—the disease yielding to local remedies alone. I subjoin brief notes of my cases, which, though taken from memory, are accurate, for they were observed with care, and made an impression upon my mind at the time, as I was aware when I saw them that Dr. Burnett believed that trachoma existed sparingly or not at all in the negro race. The first four cases were seen at the N. Y. Eye and Ear Infirmary, the fifth at the Brooklyn Eye and Ear Hospital, and the sixth in Spottsylvania Co., Virginia.

Case 1.—Negro girl, about ten years old. Trachoma and keratitis. Papillary hypertrophy and sago-like granules.

Case 2.—Negro woman, about thirty years old. Trachoma and pannus. Trachoma granules and papillary granulations.

Case 3.—Negro girl, about fourteen years old. Papillary trachoma in each eye.

Case 4.—Negro man, about twenty-five years old. Papillary trachoma and keratitis.

Case 5.—Negro man, about thirty-five years old. Myopic, with trachoma granules in upper cul-de-sac and on palpebral conjunctiva.

Case 6.—Negro man, about sixty years old. Granular lids and opacities of corneæ. Sago granules, especially noticeable in upper cul-de-sac.

# ON COCAINE AND ITS USE IN OPHTHALMIC AND GENERAL SURGERY.

By H. KNAPP.

NO modern remedy has been received by the profession with such general enthusiasm, none has become so rapidly popular, and scarcely any one has shown so extensive a field of useful application as cocaine, the local anæsthetic recently introduced by Dr. C. Koller, of Vienna. Convinced that it will not only continue to prove as valuable as it has hitherto been found, but that its properties will be the subject of numerous scientific researches and clinical observations all over the globe for many years to come, I purpose, as far as I am able, to collect in the following pages what knowledge has thus far been acquired on this highly interesting and important drug. To help the reader in gathering information is, however, not the only object of this paper; I would like it also to act as a stimulus for new investigations. From this standpoint I consider a faithful, unabridged translation of the original paper which Dr. Koller read before the Medical Society of Vienna, and published in the *Wien. med. Wochenschr.*, Oct. 25, and Nov. 1, 1884, not only as an acknowledgment of a debt of gratitude we all owe to him, but also as an appropriate introduction to the present article. The paper is as follows:

## ON THE USE OF COCAINE TO ANÆSTHETIZE THE EYE.

By Dr. KARL KOLLER, Assistant Physician to the General Hospital in Vienna.
(Translated by H. Knapp.)

"I want to report on some experiments which I have made in regard to anæsthetizing the eye. This is not my

first communication on this subject—a previous one, to secure priority, having been directed to the meeting of German oculists held at Heidelberg Sept. 15th and 16th of this year. Dr. Brettauer, of Trieste, was kind enough to deliver my paper to the Publishing Committee, and to exhibit before the Society my experiments, which have since been repeated and confirmed in different places of Germany.

It is generally known that cocaine, the alkaloid separated from the leaves of erythroxylon coca, in 1859, by Niemann, a pupil of Wöhler, possesses the remarkable property of rendering, on local application, the tip of the tongue anæsthetic. This property was discovered by Prof. Schroff, who first, in 1862, mentioned it before this Society. It is further known that cocaine, through the circulation, contracts the peripheric arteries, and it is known also that it contracts the pupil both through the circulation and on local application. From the foregoing it is evident that cocaine has been instilled into the eye in former years, but those phenomena have been overlooked which will be the subject of my present communication.

The internal application of cocaine, tried repeatedly, has always been abandoned again. In 1880 Dr. von Anrep [1] published an elaborate experimental paper on cocaine, at the end of which he points out that its local anæsthetic action may become of importance. To us Viennese physicians cocaine has been prominently brought to our notice by the thorough compilation and the interesting therapeutic paper of my colleague at the General Hospital, Dr. Sigmund Freud.[2] Starting from the supposition that a substance paralyzing the sensitive terminations of the mucous membrane of the tongue could not greatly differ in its action on the cornea and conjunctiva, I have made, in the laboratory of Prof. Stricker, a number of experiments on animals, of which, in brief, the following were the results obtained:

A few drops of a watery solution of muriate of cocaine;[3]

[1] *Pflüger's Archiv f. d. ges. Physiol.*, 21. Bd.

[2] *Centralbl. f. Therapie v. Heitler*, August number, 1884.

[3] Muriate of cocaine dissolves up to 5 % in water without addition of an acid, but always opalescent. Addition of acids is to be avoided, as a very small quantity of acid causes intense burning. The opalescent solution becomes as clear as water by filtration.

dropped on the cornea of a guinea-pig, rabbit, or dog, or instilled into the conjunctival sac in the ordinary way, cause for a short time winking of the eyelids, evidently in consequence of a slight irritation. After one half to one minute the animal again opens its eyes, which gradually assume a staring look. If now the cornea is touched with a pin-head (in which experiment we have carefully to avoid touching the eyelashes), the lids are not closed by reflex, the eyeball does not move, the head is not drawn back as usual, the animal remains perfectly quiet, and on application of stronger irritastion we can convince ourselves of the *complete anæsthesia of the cornea and conjunctiva.* In this way I have scratched and transfixed the corneæ of my animals of experimentation with needles, and have excited them with electric currents so strong as to cause pain in my fingers and become quite intolerable in the tongue; I have cauterized the cornea with the nitrate-of-silver stick until it became milky-white—during all this the animals did not move. The last experiment convinced me that the anæsthesia involved the whole thickness of the cornea, and did not affect the surface only. But if I incised the cornea, the animals manifested intense pain when the aqueous humor escaped and the iris prolapsed. I have been unable, hitherto, to decide by experiments on animals whether or not the iris could be anæsthetized by dropping the solution into the corneal wound, or by prolonged instillations into the conjunctival sac; for experiments to test the sensibility of non-narcotized animals are very complicated and difficult, and do not yield unambiguous results. The last question which I subjected to experimentation on animals, viz., whether or not the inflamed cornea could be anæsthetized by cocaine, was answered in the affirmative. The cornea in which I had incited a foreign-body keratitis became as insensible as a healthy one.

Complete anæsthesia of the cornea from the use of a 2 % solution lasts ten minutes on an average. After such successful experiments on animals I did not hesitate to apply cocaine also to the human eye, trying it first on myself and some of my friends, then on a great number of other

persons, obtaining unexceptionally the result of a perfect anæsthesia of the cornea and conjunctiva. The course of the phenomena is as follows: If some drops of a 2% solution are instilled into the conjunctival sac, or better still, let run over the cornea, first a slight burning (accompanied by some lachrymation) is felt, which in one half to one minute disappears, being followed by a dull sensation of dryness. The eye, like that of the animals mentioned above, assumes a staring look, owing to a *considerable dilatation of the palpebral fissure*, a phenomenon to the explanation of which I shall return later on. If now the cornea is touched with the head of a pin, no sensation of *pain*, or of *contact* is experienced, and all *reflexes* are absent. The same holds of the conjunctiva, in which the sensation of *temperature* is likewise abolished. The scleral conjunctiva can be grasped with a pair of toothed forceps, or a dimple can be made into the cornea by pressure, without any unpleasant sensation or the least reflex on the part of the person thus treated; the only thing he perceives is an indistinctness of objects, owing, of course, to the change in the curvature of the cornea. This complete anæsthesia lasts from seven to ten minutes, then passes through a longer stage of reduced sensibility into the normal condition. About fifteen or twenty minutes after the instillation the pupil begins to dilate. The dilatation reaches its highest degree within the first hour, decreases considerably in the second hour, and disappears without a trace in a few hours more. The pupil is never *ad maximum* dilated, responds promptly to light and convergence during the whole time, and for that reason the sensation of dazzling, connected with atropine mydriasis, is either totally absent or only slightly pronounced.

A very insignificant paresis of accommodation appears and disappears with the mydriasis; the near point receded $\frac{1}{2}''$ in myself and another person whom I examined on this point.

Furthermore I have observed a marked *ischæmia* in the normal, especially the palpebral, conjunctiva, on the duration of which I am unable to make any definite statement. Other not perfectly ascertained observations, such, for in-

stance, as the ophthalmoscopic condition, I will pass by for the present, yet I want to say that I have never noticed any *symptoms of irritation* from the use of cocaine.

As to the dilatation of the palpebral fissure, this phenomenon at all events precedes the action of cocaine on the muscles of the iris and the ciliary ligament. On account of its almost simultaneous occurrence with the anæsthesia of the cornea and conjunctiva, I have thought it to be in connection with this anæsthesia, accounting for it by the omission of the excitations which in the normal state act upon cornea and conjunctiva, and upon which the ordinary width of the palpebral fissure depends.

In regard to the anæsthesia I should not omit to mention some points of practical interest.

1. The anæsthetic effect of cocaine may be cumulated up to a certain limit, namely: if at the decrease of the anæsthesia cocaine is instilled anew, a second anæsthesia is obtained lasting longer than the first. In this way, by instillations every five minutes for a longer time, I have produced complete anæsthesia of from fifteen to twenty minutes duration.

2. The anæsthesia is chiefly a local one, *i. e.*, it is most intense in those places which have been in contact with the solution directly and longest.

3. As it can be demonstrated that cocaine is absorbed, and that from each instillation a certain, though small, quantity penetrates into the interior of the eye, first of all into the anterior chamber, it could *a priori* be expected that the deeper structures of the eye might be anæsthetized if they could be reached by sufficient quantities of the remedy. But as the absorption requires a certain time, and the anæsthesia of the cornea is of short duration, the anæsthesia of the cornea will have disappeared before the iris and ciliary body are acted upon. We must therefore anæsthetize the cornea again. Both demands can be satisfied by successive applications. By instillations of a 5 % solution made every five minutes and continued for about half an hour, I have succeeded in ascertaining an action upon the deeper parts of the globe, inasmuch as its sensibility on stronger pressure was essentially diminished.

I am indebted to the liberality of Dr. v. Reuss, acting surgeon of the clinic of the late Professor v. Jäger, for the opportunity of testing, during the last two or three weeks, the action of cocaine on diseased eyes.

From the beginning I have thought that therapeutically cocaine might be used in two directions: first, as a *narcotic* in *painful affections, of the eye*, and secondly, as an *anæsthetic* in *operations on the eye.*

In regard to the first category I have expected a good deal of benefit from its action in *diseases* of the *cornea* and *conjunctiva* accompanied by *pain* and *photophobia.* I have used cocaine in a greater number of patients suffering from lymphatic (phlyctenular) conjunctivitis with eruptions and ulcers of the cornea, and a 2 % solution in one patient affected with frenulum vasculare (from successive phlyctenulæ). All patients thus treated have said that a few minutes after the instillations they have *felt* materially better, pain and photophobia having considerably diminished. With the same unanimity, however, they have complained that two or three hours after the instillation pain and photophobia have returned. It might therefore be expected that by applications repeated at such intervals pain and photophobia could permanently be removed or at least abated. This mode of application has not yet been tried. Under the conditions to which I have limited my experiments I have not noticed any influence on morbid processes either in the one or the other direction.

With similar result I have used cocaine in a man with painful *erosion at the sclero-corneal junction.*

I should think that cocaine might exert its influence also on the *pain in iritis*, for I believe to have demonstrated that its anæsthetic effect extends in a certain degree to the iris and ciliary body. The mydriatic effect, on account of its insignificance, would not merit great consideration, but we may expect some influence from its property of contracting the blood-vessels. The combination with atropine treatment may, perhaps, be of advantage. I have not yet had an opportunity to try it in this disease.

The sensation of pain from cauterizing the lids with ni-

trate of silver can, by previous instillation of cocaine, either be entirely suppressed or at least materially weakened. The majority of the patients in whom this treatment has been tried, have alleged to have felt no pain at all; in others the pain, after a time of latency, has reappeared, but could be suppressed again by a repeated instillation. One patient said the pain had been much less severe, but had lasted longer.

On the utility of cocaine in the bluestone treatment my observations are few in number and contradictory; at any rate it should here be used much more intensely than in touchings with nitrate of silver in solution.

I come to the second category of the use of cocaine, viz.: as an *anæsthetic in operations on the eye.*

It does excellent service in the *removal of foreign bodies from and out of the cornea*, often a difficult task on account of the restlessness of the patient. In a larger number of such patients (about thirty) I produced the anæsthesia by letting two drops of a two-per-cent. solution run over the cornea while the patient was looking down. The instillation was repeated in from three to five minutes. All these patients have asserted to have lost the sensation of a foreign body; they held their eyes entirely quiet while the foreign body was digged out of the cornea with a needle, and, on being asked what they had felt, all have answered they had felt nothing at all.

With the same good result cocaine has been used in a case of *tatooing corneal scars*, and in an *operation for pterygium.*

Good results may be expected from cocaine in *cauterization of corneal ulcers* with the glowing iron, in paracentesis of the cornea, and in discision of cataract. Both the latter operations, as I have noticed in experiments on animals, and also in man, can be made absolutely without pain, for they consist only in fixing the conjunctiva and puncturing the cornea.

Dr. v. Reuss has performed *staphyloma operation* in a boy of ten and a girl of seven years without narcosis, but only by the use of cocaine after the method to be described presently. The children have kept perfectly still, and, according to their own statement, have experienced no pain.

Dr. v. Reuss was further kind enough to allow me to use cocaine in eyes on which he was to perform *iridectomies* and *extractions of cataract*. On the whole, I would like to say only that all these cases ran their *course without irritation*, a fact which certainly encourages to further trials. The experiments yielded more or less favorable results, but always corresponding to the intensity and manner in which the remedy was applied. The most favorable, as to painlessness during the operation, indeed almost entirely satisfactory, results were obtained in those cases in which the following method was strictly pursued: During half an hour immediately before the operation, two drops of a five-per-cent solution were instilled every five minutes. The head of the patient lies horizontal, and while he looks toward his feet, his upper eyelid is raised and the solution dropped on the upper part of the sclerotic.

One of the patients thus treated, a woman, on whom an extraction of cataract was performed, stated, on being questioned at the different steps of the operation, that she felt nothing at all of the corneal section; she did feel it when the iris was seized and drawn out, but it pained her only a little. She reacted on none of the steps of the operation; the same was the case with a weak-minded woman on whom the same operation was performed, which Dr. v. Reuss had dreaded on account of her great sensitiveness.

The following case seems to me remarkable on account of its peculiar conditions:

A man with seclusion of the pupil on both sides underwent an iridectomy on the left eye after cocaine application. He did not react in the least on the operation, said that he had not felt at all the corneo-scleral section (with the lance); he had felt the seizing and drawing out of the iris, but it had not given him any pain. A week later the same man was operated on the other eye, the cocaine this time being omitted. He pressed and squeezed in such a way that he rendered the operation quite difficult, as Dr. v. Reuss told me afterward.

Even if the majority of the patients that have to undergo such operations are torpid, persons who patiently bear their

pain, yet the last case seems to demonstrate that also in such cases an anæsthetic may be of great service.

### AMERICAN CONTRIBUTIONS.

Two weeks before the original of Dr. Koller's paper was published in Vienna, American physicians were informed of its substance. Merck's muriate of cocaine being in the New York market, they without delay tried the new anæsthetic in every direction, finding for themselves a number of important facts before Dr. Koller's or other European publications reached them. This occurred in the following way:

Dr. Hy. D. Noyes, of New York, travelling in Europe, sent to the *Med. Rec.* a letter, published in that journal on Oct. 11, 1884, under the title: "A few cursory notes on the proceedings of the meeting of the German Ophthalmological Society, held at Heidelberg in the middle of September of this year." One of his notes at once attracted the greatest attention among the oculists of New York, and I dare say those of the whole country. It was "the extraordinary *anæsthetic* power which a two-per-cent. solution of muriate of cocaine has upon the cornea and conjunctiva when it is dropped into the eye." The cornea and conjunctiva can be touched and rubbed with a probe, a speculum inserted, the conjunctiva grasped with a pair of fixing forceps, and the eye pulled in different directions without any unpleasant sensation. "The solution causes no irritation of any kind, and its effect disappears in fifteen to thirty minutes." Its remarkable anæsthetic property was discovered by a young physician, Dr. CARL KOLLER, Secundararzt at the General Hospital of Vienna, only a few weeks before its presentation at the Heidelberg Ophthalmological Congress through Dr. Brettauer. "Dr. Koller had made but few trials with it. These he had been led to make from his knowledge of the entirely similar effect which it has, for some years or more, been shown to have over the sensibility of the mucous membrane of the *mouth*, *pharynx*, and *larynx*. The substance makes a clear solution, and is found in Merck's catalogue."

A short communication on the same subject is published in a report of the same meeting by the *Ophthalmic Review* (London, October, 1884, p. 316). It adds to the account of Dr. Noyes only the following statement: "The drug causes a slight *mydriasis*, which lasts a couple of hours, and is accompanied by *some paresis of accommodation, but reaction to light and eserine is not obliterated.*"

A third communication is found in No. 39 of the *Wiener med. Wochenschr.*, Sept. 29th, p. 1175, as follows: "Referring to Dr. Koller's communication to the Heidelberg Ophthal. Congress, Dr. EDMUND JELLINCK informs us that he had noticed a similar anæsthetic and *analgesic* effect when a cocaine solution was brushed over the mucous membrane of the pharynx and larynx. A detailed account will be given when both experiments are concluded."

The above is all that has come to my knowledge on cocaine, from European sources until Nov. 25th, when Dr. Koller's original publication in the *Wien. med. Woch.* of Oct. 25th reached me.

The first American contributions are short notes contained in the *Med. Record* of Oct. 18th, p. 438 by Drs. C. R. AGNEW, W. O. MOORE, and J. L. MINOR, concerning the application of cocaine to eye-patients. AGNEW reports on two *squint* operations that had been done without pain under cocaine; on a case of *injury* to the eye, where the remedy had in a few minutes relieved great *irritability* and *blepharospasm*; and on another where the extreme *sensitiveness* to the touch was so reduced by the remedy, that in two and a half minutes the patient permitted his sclera to be touched with the finger without wincing. MOORE used it in a case of a *corneal ulcer* "which was touched and gently scraped without sensation"; further in an operation for *pterygium*, which was done with the utmost ease and without any painful sensation; then for *squint* in a boy, æt. seven, who "made no complaint of pain, and simply said that the speculum stretched the lids, but was painless." MINOR used it *to remove the sutures* after a strabotomy which had been done three days previously. The speculum was introduced and the stitches taken off without pain. The patient

was a boy of ten years. He used it further in an exceedingly excitable lady, who had a *cataract extracted* easily and without pain. She said that she had not been hurt.

The number of the *Med. Rec.* of Oct. 25th (issued Oct. 24th) contains a paper on cocaine by myself, and one by Dr. D. B. St. JOHN ROOSA. Roosa used it in four operations of strabismus, the pain being greatly reduced; in a third case the patient experienced considerable pain, and said she would take ether the next time. He used it locally upon the membrana tympani, in one case of that rare disease, *tympanic neuralgia*. The patient said the pain was relieved in ten minutes after two instillations.

In MY OWN paper I first gave some pharmacological notes about cocaine, indicating the literary sources from which they were taken. I will only mention here that the first to isolate an alkaloid from the coca leaves was Gaedcke, who gave it the name *erythroxiline*, in 1855. Niemann and Lossen investigated it more thoroughly in 1860 and '62; Lossen analyzed it and found for it the formula: $C_{17}H_{21}NO_4$. I made experiments with cocaine on all accessible mucous membranes, except that of the vagina and uterus. *In the eye* I found that it produced neither pain nor any discomfort. The movements of the globe and the ophthalmoscopic condition remain unchanged. The tension in healthy eyes is either unchanged or slightly diminished.

"The *diminution of sensibility in the cornea and conjunctiva* varies in different individuals. In most cases it becomes manifest as early as two or three minutes after the first instillation, increases for ten to twenty minutes, then decreases and is over in about half an hour. When another instillation is made, ten to twenty minutes after the first, the anæsthesia is more intense, on superficial touching mostly absolute, and lasts longer. In an hour after the first instillation it becomes very feeble and disappears in one hour and a half.

"The *pupil begins to dilate* ten to twenty minutes after the first instillation, increases slowly for ten to forty minutes, scarcely ever becomes as large as with atropia (*maximum dilatation*,) feebly responds to changes of light, remains stationary for about thirty minutes, and then slowly disap-

pears. The last trace had disappeared on the next day only."

[To try whether cocaine could produce a maximum dilatation, I have instilled a 3 % solution into the eye of a child for one hour and forty minutes every five to ten minutes, and during the last ten minutes every two minutes. The pupil became very large, but contracted to a certain degree, when exposed to light. The reaction was slow and limited, but distinct and invariable during the time of experimentation, and some hours later.]

"The *range of accommodation is shortened* by recession of the near point from the eye, the far point not being appreciably influenced. The shortening of the range of accommodation in me and my son (15 years old) was equivalent to $\frac{1}{36}$ (1D); in a lady of thirty-two it was somewhat more. Cocaine, therefore, reduces the accommodation, but does not paralyze it. It may be preferable to other mydriatics if we want to dilate the pupil for ophthalmoscopic examinations of the interior of the eye, but it will probably not be powerful enough for determinations of refraction. It is a mydriatic which, even in producing a considerable dilatation of the pupil, takes away only a fraction of the power of accommodation. The accommodation is restored much sooner than the normal size of the pupil. In $1\frac{1}{4}$ hours to $1\frac{1}{2}$ hours we could read again as easily as before, though our pupils were still enlarged.

"*Cauterization of a 'cocainized' conjunctiva.*—The conjunctiva of my right eye was a little congested, and at 10:30 P.M., while writing this communication, I dropped a drop of a four-per-cent. solution of hydrochlorate of cocaine on the inner surface of the lower lid. Fifteen minutes later I noticed that this inner surface had become pale, paler than that of the left eye, which had been the paler before. I dropped another drop in, holding my head back so that the whole conjunctiva was moistened by it. Then I painted, before a looking-glass, a good-sized camel's-hair brushful of a two-per-cent. solution (gr. x. ad ℥ j.) of nitrate of silver into the eye, the lower lid being everted. I left the liquid in place about twenty seconds, then it began slightly to

smart, whereas immediately after the application I only felt the cold, no pain. I washed the nitrate of silver away with ordinary water, and put another drop of cocaine in. This relieved the smart for five minutes, then it returned, but very slightly; a serous liquid ran from my right nostril, just as it does when a stronger solution of nitrate of silver is put in the eye in the ordinary way. I instilled another drop of cocaine and continued writing. In a quarter of an hour the eye felt hot and somewhat painful. The conjunctiva of the lower lid was moderately, that of the adjacent scleral conjunctiva slightly, red, and along the whole lower fornix lay a white streak of mucus. The cornea and upper scleral and palpebral conjunctiva were white as if nothing had been done. The pupil was wide, and the accommodation somewhat weakened, not so much as to make writing unpleasant, though the other eye had been 'cocainized' in the afternoon of the same day."

EXPERIMENTS ON THE EFFECT OF COCAINE ON OTHER MUCOUS MEMBRANES.

"1. **The ear.**—I have made only one experiment in this locality. It was an almost painless removal of polypoid granulations. I do not doubt that the remedy will find here a large field of application, both to allay pain and to render the parts insensible during operations in this exceedingly sensitive cavity. [In cases of perforation of the drumhead I noticed that cocaine anæsthetizes the mucous membrane of the drum cavity, but not the drumhead.]

"2. **The mouth.**—I can confirm the former observations that the tongue and the soft palate become numb. I sprayed and brushed my soft palate; in ten minutes I could pass instruments over it without pain or reflex phenomena, retching, etc. I brushed a four-per-cent. solution over the right half of my tongue from the tip to the base, held the tongue depressed with my finger and immovable as long as I could endure it. In seven minutes I repeated the manipulation; five minutes later the right side of the tongue and corresponding lip felt numb. Gentle touching was not perceived, but quite well on the other side. Then

I put, with a fine brush, some powdered sugar on the insensible parts, successively from the tip to the neighborhood of the palate. It was not perceived, whereas when put in the same way on the corresponding places of the other half of the tongue, it was at once tasted. The same was the case when common salt and a one-per-cent. solution of sulphate of quinine were placed on the tongue. In half an hour all was normal again. Conclusion: *Cocaine temporarily and locally destroys not only the sensibility and reflex mobility of the tongue and pharynx, but also the faculty of taste.* In the endeavor to suspend the sense of taste altogether, I sprayed my mouth and palate. The taste was much reduced, but not abolished, evidently because the remedy in this experiment had not sufficiently acted on all the portions of surface from which impressions of taste are received.

"3. **The nose.**—I brushed and sprayed the nose to test the action of the new remedy on the organ of smell. The experiments required a good deal of time and material before they were successful. The lower parts of the nose soon had a numb feeling and were insensible to the touch, but the power of smell was preserved. Bearing in mind that olfaction is the function of the upper nasal passages, the recesses of which are very difficult of access, I bent my head down so as to make the vertex its lowest part, and introduced the bent nozzle of a Richardson atomizer in such a way that the spray was directed from the lower to the middle and upper nasal passages, and the liquid flowed also in the same direction. This manœuvre had to be repeated three times before the faculty of smell was destroyed. Perfumes of rose and heliotrope were not perceived. Tincture of iodine, concentrated nitric acid, etc., produced no peculiar sensation, whereas on the other side they felt very unpleasant and produced coughing. *Cocaine*, therefore, *temporarily renders the mucous membrane of the nose insensible and destoys the sense of smell.* In less than half an hour the whole effect of the remedy had vanished.

"4. **The larynx and trachea.**—I am just suffering from an attack of acute bronchitis, with fits of troublesome cough-

ing in the morning and evening. When one of these fits came in the evening, I sprayed my larynx with cocaine and inhaled it as well as I could by means of a Richardson apparatus. The irritation was at once allayed, and soon subsided. I had no cough, but half an hour later I threw out, free from irritation, a large, compact, muco-purulent sputum. If this experiment should be confirmed by others, and the effect be the same or similar, cocaine will prove a great boon to patients with pulmonary difficulties. The perfected methods of introducing medicated substances by means of the ingenious apparatuses of Dr. Sass would relieve the distress of coughing and its prejudicial consequences. I may add, however, that the Richardson apparatus, which seems inadequate for this purpose, relieved me only partially in a second, and not at all in a third, attack during the night.

"5. **The urethra.**—My urethra is very sensitive to the introduction of instruments. I injected, by means of an Eustachian catheter and a balloon, a four-per-cent. solution of cocaine, and held it in for a few minutes. In ten minutes the glans had become pale and insensible to the touch. I repeated the injection. Seven minutes later I introduced a catheter and other instruments into the urethra. I did not feel them at all as far as 3″; when pushed farther I felt them very unpleasantly painful. Evidently the cocaine had not penetrated more deeply. Before the injection of cocaine I felt the instruments very keenly from the beginning of the urethra. To test the loss of sensibility of the cocainized urethra in another direction, I injected a one-per-cent. solution (gr. v. ad ℥ j.) of arg. nitr. into the anterior part by means of an Anel's syringe, introduced as far as 1½″. I had no sensation from it at all. In about thirty seconds I passed water, which caused a slight burning, disappearing in about a minute. Since that time I have not felt any thing from the treatment of my urethra. This experiment shows, and I feel convinced, that cocaine will prove most beneficial in uro-genital surgery. It not only destroys the sensibility of the parts, and therefore admits of the easy performance of many surgical procedures, but by being painless these

procedures will not incite reflex phenomena, spasm, and the like.

"6. **The rectum.**—For the sake of completeness I injected cocaine also into the rectum. The sensibility, which was not great anyhow, was reduced."

I have taken the liberty to reprint the above experiments from the *Medical Record* (Oct. 25th), because some of them were new—*e. g.*, those on the urethra, the rectum, and the upper nasal passages.

The remainder of my paper contains the description of the application of cocaine in nine patients: squint, foreign body, pterygium, cataract-extraction, tumor sacci lacrymalis, polypi auris, in all of which the anæsthetic effect of cocaine was evident. In two cases of *old trachoma* the following is said: "Insensibility of cornea and conjunctiva; touched with sulphate of copper. No pain, no irritation, scarcely any increased congestion after the application. No discomfort as when touched before."

The *N. Y. Med. Journ.* of Oct. 25th, pp. 459–461, contains two papers on cocaine. The first is a short report of Dr. Leroy P. Walker, resident surgeon of the N. Y. Eye and Ear Infirmary, on fourteen cases treated with cocaine by Dr. W. F. MITTENDORF. These were: Three cases of squint, operated on without pain; three cases of *discision of cataract*, two primary, one secondary; all without pain. One *iridectomy;* no pain. Four cases of foreign body imbedded in the cornea; removed absolutely without pain. One of *burn* of cornea and conjunctiva with hot metal; pain of eye removed. One case of injury by a fragment of metal. Great *pain*, *photophobia*, and *lachrymation* removed by cocaine—ten drops insilled twice in five minutes. One case of painful corneal ulcer after contusion; relief by cocaine during thirty-six hours. Ulcer healed by this time.

The paper concludes with saying: "In five cases of *sensitive throat* I have been enabled not only to use the mirror, but to prick the mucous membrane with a sharp-pointed instrument without pain and with very little 'gagging.'"

The second paper is a report of cases from Dr. E. GRÜNING'S practice by Dr. J. H. Claiborne, Jr. In extraction of

cataract from both eyes at the same sitting, only the iridectomy caused pain. In an iridectomy for *degenerated glaucoma*, the corneal section was attended with no pain, the iridectomy with pain. A foreign body was removed from the cornea without pain, and *massage* in a case of *episcleritis* was less painful under cocaine than before.

Dr. D. C. COCKS, of New York, published in *Med. News*, Oct. 25, 1884, p. 455, several cases in which he found cocaine anæsthesia of use, viz.: 2 of *foreign bodies* of the cornea; 2 of *quint*; 1 of *tattooing* of the cornea. It allayed the pain in a case in which the cornea was *scratched by an infant's nail*, but not in another in which the cornea and conjunctiva were *burnt* with a red-hot piece of iron.

Dr. E. S. PECK, New York, (*Med. Rec.*, Nov. 1, 1884, p. 494,) used cocaine suceessfully in *stitching a lacerated wound of the eyelid*, "cutting through the conjunctiva, the tarsal margin, and the integument. A stitch in the conjunctiva and two in the integument were taken after six instillations of a 4 % solution, covering 25 minutes. Patient experienced no pain, either from the forceps or needles, and stated that the sensation had been as if something had been pressed against the parts involved."

Dr. W. H. POLK, of New York, introduced the new anæsthetic into operative *gynæcology*. November 1, 1884, he published (*Med. Rec.*, p. 489) two cases of trachelorrhaphy. After thorough cleansing and drying of the parts, a 4 % solution was painted over the cervix, in the canal, and over the adjacent vaginal wall with a camel's-hair brush. This was repeated twice at intervals of two to three minutes. Within three minutes of the last application the operation was begun. It required the removal of extensive pieces of cicatricial tissue. The operations lasted 40 minutes. The patient suffered no pain until the last 10 minutes, then she spoke of her discomfort as being a sense of soreness rather than of pain.

In the second case no pain was felt till the lapse of about 20 minutes, then it was so acute as to require an application of the solution of cocaine, making in her the fourth. It was made directly to the cut surfaces, which had first been freed

from blood. The operation was completed in three minutes without any further pain.

The drug seemed not only to blunt sensibility, but retard the first appearance of blood on the cut surfaces.

Dr. E. GRÜNING, of New York, communicates (*N. Y. Med. Jour.*, Nov. 1st, p. 488), through the pen of Dr. Claiborne, "more clinical facts regarding the hydrochlorate of cocaine," from his hospital and private practice. They consist in two iridectomies (for artificial ripening of cataract), one strabotomy, one pterygium operation, and the two following cases:

1. Advancement of the external rectus. "Exposure of the muscle, tenotomy, and insertion and tying of the sutures were attended with considerable pain."

2. Hypertrophy of the mucous membrane covering the inferior turbinated bone. "Eighteen drops of a 2 % solution were instilled into the inferior meatus, and as nearly as possible on the mucous membrane of the inferior turbinated bone. Six drops were instilled every three minutes. A few minutes after the last instillation, the actual cautery was applied," and caused no pain.

The article ends with the following remark, which is of interest: "Considering the high price of cocaine, it has been suggested to the minds of many that its cheaper sister alkaloids—caffeine, theine, theobromine, and guaranine—might be possessed of similar anæsthetic properties. As there are no stable single salts of these alkaloids, extensive experimentation has been made by Dr. Grüning with the double salts, the salicylate of sodium (2½ %) and caffeine (4 %), and the benzoate of sodium and caffeine (4 % each) in watery solution. In no case, however, has he obtained any anæsthetic effect with either."

The *Boston Med. and Surg. Journal* of Nov. 6, 1884, contains two papers on cocaine; the second, by C. H. WILLIAMS, confirming the anæsthetic effects of cocaine in several operations; the first, entitled "Rapid Cocainization," by H. W. BRADFORD, containing a number of valuable new observations and suggestions.

In a case of incised wound in the ciliary region, the *pro-*

*lapsed iris*, after the third instillation, in the twelfth minute, was seized with forceps and snipped with scissors, the patient not feeling the slightest pain.

Traumatic *ulcer of the cornea with hypopyon;* 2 % solution; 12 minute. Upon the introduction of the iris forceps to dilate the opening into the anterior chamber, slight pain was complained of, which was not experienced after placing a drop along the line of incision. The usual pain due to evacuation of the aqueous was not noticed.

In the following nine operations, Bradford used an 8 % solution, of which one drop was instilled every minute. The anæsthesia was complete in between two and five minutes. In *strabotomy* the conjunctiva was seized with forceps at the end of the second minute, cut and dissected up, and one drop placed near the site of the muscle, which was then divided. The patient said the operation was in no way painful.

In a case of *cataract*, the speculum was inserted at the end of the third minute. At the end of the fourth minute one drop was placed upon the corneal incision, and half a minute later the iris was seized, drawn out, and divided, the patient complaining only of a slight twinge of pain. The hemorrhage from the iridectomy was very slight and transient, being in marked contrast to an iridectomy under ether.

"There has been thus far in this line of cases no bad results noticed." Dr. Bradford thinks that there may be a method of rapid cocainization, provided a sufficiently strong solution is used and the intervals between the successive instillations are sufficiently short.

Dr. W. O. MOORE, *Med. Rec.*, Nov. 8, 1884, p. 511, adds some valuable observations to his former communication. In a case of iridectomy for *leucoma adhærens*, he injected, after the section, two drops of a 2 % solution through the corneal wound on the iris surface. The iris section proved to be painless, and the operation did well.

After the slitting of the canaliculus in a case *of stricture of the tear duct*, the conjunctiva having been anæsthetized by cocaine, an Anel's syringe, charged with eight drops of a 4 % *cocaine solution* was introduced into the cut canal, and

the fluid *forced into the nasal duct* as far as it would go. After waiting four minutes, the No. 8 probe was passed without pain down to the roof of the mouth; this was then removed and a lead wire introduced, the patient all the time having no sensation. In twenty minutes after the injection, the lead wire, having been purposely left, was felt for the first time.

In a case of *syphilitic iritis*, the *pain*, not influenced by atropine, was *relieved* by cocaine. It returned in the night, but not so severe.

In an *irritable stump* he used some twenty drops, with same benumbing influence, yet not sufficient to warrant the removal of the eye, which, after two minutes, was removed in the "old-fashioned" way.

In a strabotomy, he "dropped six to eight drops on the conjunctiva and injected six drops under the conjunctiva, over the site of the muscle. This procedure caused the pain to be entirely abolished. No bad after-effect occurred."

Dr. E. O. SHAKESPEARE, of Philadelphia, published (*Med. News*, Nov. 8, 1884, p. 508) a number of experiments on himself and patients—external inflammations, one iridectomy—confirming the physiological, anæsthetic, and analgesic action of cocaine.

Dr. F. H. BOSWORTH publishes a very important contribution: "A New Therapeutic Use for Cocaine," in the *Med. Rec.*, Nov. 15, '84, p. 533. When a two-per-cent solution is applied to the mucous membrane of the *nasal cavity*, by means of a pledget of cotton wrapped on a small probe, it produces in twenty or thirty seconds a very notable contraction in the venous sinuses, covering the lower and middle turbinated bones, expelling all the blood so that the membrane clings closely to the bony structures, which then become visible in absolute outline. Entire depletion of the sinuses of the whole cavity is accomplished in about three minutes, the production of anæsthesia, as a rule, requiring a longer time. Dr. Bosworth has used this property of cocaine to differentially distinguish *venous turgescence*, which is eliminated by the remedy, from *genuine hyperplasia*, which is not; further, cauterizing the mucous membrane

was rendered comparatively painless by the drug; in *acute coryza* the venous sinuses were completely emptied, and the nasal passages remained absolutely clear; in the *removal of nasal polypi* the swelling of the mucous membrane was reduced, a clear view into the upper regions of the nose was obtained, so that it became comparatively easy to recognize and remove even the smallest growths. In no case was there other than the most trivial bleeding. In two cases of *autumnal catarrh* there was complete relief from all the symptoms. He thinks that cocaine will control epistaxis from whatever cause.

Dr. N. J. HEPBURN publishes the results of hypodermic injections of cocaine, *Med. Rec.*, Nov. 15, '84, p. 534. Six minims of a two-per-cent. solution were *injected under the skin* of the arm; in four minutes complete anæsthesia of the skin eight lines in every direction from the centre of the injection. The injections were repeated every five minutes in adjacent spots until forty-eight minims had been used. By this time the general effects had been so marked that it was deemed unadvisable to continue the experiment. There were acceleration of pulse and respiration, an agreeable feeling of warmth, moderate mydriasis, slightly crossed diplopia, agreeable hallucinations with closed eyes, disappearing when the eyes were opened; impairment of cutaneous sensibility, a feeling as if walking on cushions, a tendency to walk on the heels, and a sensation, on grasping an object, as if something spongy were interposed. Two other experiments had the same results, but the number of six- and eight-minim injections could be carried on to sixteen before they had to be discontinued.

Dr. E. E. HOLT, of Portland, Maine, (*Boston Med. and Surg. Jour.*, Nov. 20, '84,) instilled one drop of a *one-per-cent. solution* into a cataractous eye thirteen times in the course of two minutes, then removed the cataract. "The eye was particularly unsound, since, when the counterpuncture was made, vitreous was seen to present, but by careful manipulation *no vitreous was lost*, and it is believed that the use of the drug assisted materially in preventing such a disaster.

Dr. E. R. SQUIBB (*N. Y. Med. Jour.*, Nov. 22, '84) states that he had received a letter from Dr. Noyes before the one which had appeared in the *Med. Rec.*, and that he had immediately sent some of the hydrochlorate of cocaine to Dr. C. S. Bull and another gentleman [Mathewson]. Dr. Bull was probably the first man in this city [and country] to employ the drug, which was on Oct. 8, '84. Dr. Bull has used it very extensively since. His first and, thus far, only publication is a very well-written paper, read before the N. Y. State Medical Association, Nov. 19, '84, and published in abstract in the *Med. Rec.* and the *N. Y. Med. Jour.*, of Nov. 22d, and in full in the *N. Y. Med. Jour.*, of Nov. 29th, p. 609. His physiological experiments confirm what has been made known by Koller and others. He has used the drug in more than 150 cases, and has succeeded in producing complete anæsthesia in all but three cases, while in these three cases the sensibility was decidedly diminished. In no case has he seen the pupil become so dilated as from atropine, even when a four-per-cent. solution has been used. In one case no dilatation of the pupil was produced after repeated instillation of the stronger solution, though atropine acted promptly on this patient.

As illustrations of the usefulness of cocaine in ophthalmic surgery he reports ten cases.

*Abscess of cornea;* cornea transversely split; no pain.

*Kerato-iritis* with hypopyon; broad paracentesis of cornea with lance-knife; pus evacuated without pain. *Squint;* conjunctiva opened, cocaine instilled beneath; five minutes later another instillation, then—ten minutes after opening the conjunctiva—tenotomy without pain. *Chronic glaucoma:* two drops of a two-per-cent. solution were dropped through the corneal wound into the anterior chamber, and in ten minutes a broad iridectomy was completed without the slightest sensation of pain.

A *cataract*, after a preliminary iridectomyy had been previously done, was extracted (peripheral incision, quadrilateral capsulotomy) with ease and entire absence of pain.

Retention *cyst* of the ocular conjunctiva. A two-per-cent. solution was instilled twice, and within ten minutes the cyst

was slit up, its contents evacuated with the spoon, and its inner surface cauterized with tincture of iodine—all painlessly.

*Mucocele, with stricture of nasal duct.* Instillation of cocaine four per cent. through lachrymal punctum, canaliculus slit, sac opened, contents evacuated; solution dropped into duct through opening in sac; in ten minutes the stricture thoroughly divided with Stilling's knife, and a large-sized Theobald's probe introduced—all painlessly.

"It may thus be seen that almost all the various operations on the eyeball and inner surface of the eyelids, and on the tear-passages may be performed painlessly under the anæsthetic influence of cocaine. The only operation in which it may not answer its purpose is that of enucleation.

He adds that he has performed *paracentesis of the membrana tympani* three times with entire absence of pain, has removed exuberant granulations from the depth of the ear-canal under cocaine without pain. He has used the solution in acute coryza, both nostrils being almost completely occluded, with such effect that in less than ten minutes both nostrils were entirely free, and remained so for about five hours. The swelling then returned, but to a less degree. The application was made through the nostrils with a probe and cotton, and through the posterior nares to the mouth with a brush.

Dr. F. M. WILSON, of Bridgeport, Conn., relates ("Cocaine Hydrochlorate in Minor Surgery," *Med. Rec.*, Nov. 22, '84) the painless removal of a small *fatty tumor upon the forehead* after subcutaneous injections of cocaine.

The *N. Y. Med. Jour.* of Nov. 22, '84, gives a report of the meeting of the Clinical Society of the N. Y. Post-Graduate Medical School and Hospital, held Nov. 8th. The subject for discussion was hydrochlorate of cocaine. Dr. GEO. B. HOPE reported the case of a *papilloma of the larynx* which had been made much easier by cocaine anæsthesia. Dr. A. H. SMITH related a similar case. The growth, twice the size of a coffee-bean, had resisted all former attempts on account of spasmodic closure of the glottis. Under cocaine a loop was introduced through the

glottis, passed around the neck of the tumor, and on drawing the wire home the growth was readily separated from its attachment and brought out entire. It would be difficult to imagine any thing more satisfactory than the effect of the cocaine in this case.

Dr. S. D. POWELL could dilate under cocaine *a deep urethral* stricture where the sensitiveness was so great that the introduction of even the softest instrument, without anæsthesia, was impossible.

Dr. H. G. LYTTLE reported a case of *internal urethrotomy* under cocaine. The penis became quite small, cold, and anæmic, especially the glans. No unpleasant after-effects were noticed from the use of the drug.

Dr. A. H. SMITH said that Dr. SHAW had used cocaine in *removing a toe-nail.* He had wrapped the toe for a few minutes in cotton saturated with cocaine solution, had then divided the nail and removed it without pain.

Dr. M. J. ROBERTS reported that Dr. Eddy, a dentist, had used it with success in *cutting-operations upon the gums*, but had not found it of any benefit when applied in sensitive teeth.

Dr. C. A. VON RAMDOHR had succeeded in making an *examination* in a case of *vaginismus*, which had always before resisted every attempt, by brushing the mucous membrane with some of the solution.

Dr. B. BETTMANN, of Chicago, (*N. Y. Med. Jour.*, Nov. 22, '84, and *Jour. Am. Med. Assoc.*, Nov. 22, '84,) *probed the tear-duct*, after having slit the canaliculus and injected cocaine.

In a case of severe *earache* from acute purulent otitis, a few drops of the solution instilled into the ear caused almost immediate cessation of pain, and the ear could be manipulated without the slighest annoyance to the patient.

Dr. J. BETTMANN, of Chicago, (*ibidem*,) reduced the swollen erectile tissue in the nose by galvano-cautery painlessly under cocaine in a case of reflex *asthma nervosum.*

Dr. C. F. CLARK, of Philadelphia (*Med. News*, Nov. 22, 1884,) performed a tenotomy of each internal rectus virtually without pain by dropping cocaine in the wounds as he proceeded. He noticed the ischæmia of the parts as a striking feature.

Dr. E. F. INGALS, of Chicago, (*Jour. Am. Med. Assoc.*, Nov. 22, '84, p. 572,) reports a number of cases in which cocaine was advantageously used for *various affections* of the *nose and throat, e. g.*, naso-pharyngeal fibroma, nasal polypi, swelling of turbinated body, hypertrophic catarrh, cystic tumor, etc.

Dr. C. J. LUNDY, of Detroit, publishes his experiments and experience with cocaine in the *Jour. of the Am. Med. Assoc.*, Nov. 22, '84, p. 575, and the Nov. number of the *Phys. and Surg.*, Ann Arbor, Mich. He used it in the ordinary operations on the eye, and besides in a case of enucleation, but before the operation was completed the patient complained of pain, and chloroform was given.

Dr. SAMUEL THEOBALD, of Baltimore, publishes among others the following cases (*Md. Med. Jour.*, Nov. 22, '84, p. 57). In an eye affected with *inflammatory glaucoma* the drug was probably very imperfectly absorbed, and the anæsthesia was incomplete. The operation nevertheless caused less pain than one performed previously on the other eye.

In a case of enucleation cocaine was instilled before and during the operation, getting, to some extent, under the conjunctiva. The section of the muscles and the division of the nerves of the eye were evidently attended by severe pain.

Dr. J. A. MICHAEL, of Baltimore, (*ibidem*, p. 59,) communicates the successful employment of cocaine in *venereal surgery, e. g.*, removal of venereal warts with broad bases, the operation of phimosis, incision of a contracted meatus with chronic gonorrhœa, of a suppurating bubo, cauterization of small ulcers with chloride of zinc. In all these cocaine had materially lessened the pain.

Under the head, " Hospital Reports," the same issue of the *Md. Med. Jour.* gives an enthusiastic account of the manifold applications of cocaine at the Presbyterian Eye, Ear, and Throat Hospital of Baltimore, by Dr. CHISOLM, without adding any thing new.

Dr. A. T. CABOT, of Boston, (*Bost. Med. and Surg. Jour.*, Nov. 27, '84, p. 515,) reports on the more or less painful operations of congenital *adhesions of the prepuce and urethral*

*stricture* under cocaine. Dr. F. I. KNIGHT used the drug in the form of spray in two operations for *laryngeal papilloma* without much effect on brushing a solution on the pharynx of a phthisical patient.

Dr. W. C. BURKE, of South Norwalk, Conn. (*N. Y. Med. Jour.*, Nov. 29. '84), injected cocaine under the skin of the hand, which was swollen and painful from a *shot*, the ball being situated near the first phalanx of the little finger. Neither the cut nor the subsequent manipulation in the removal of the belt gave him any pain whatever.

Dr. G. T. JACKSON, of New York, (*N. Y. Med. Jour.*, Nov. 29, '84,) rubbed a *four-per-cent. ointment of cocaine and oleic acid* into the skin for about five minutes, and found that *epilation* and the removal of superfluous hairs from the upper lip and cheek of a female patient by electrolysis were done with slight or no pain.

The report of a novel and very neat application of cocaine in a case of *enucleation*, by Dr. C. S. TURNBULL, oculist to the German Hospital of Philadelphia, is contained in an editorial of the *Med. and Surg. Rep.*, Nov. 29, '84, p. 628. Two drops of a four-per-cent. solution of cocaine were instilled every three minutes until eight had been used. When Tenon's capsule was opened, one drop of the solution was allowed to flow into the cut. As each tendon was caught up with the hook, a drop fell upon it, and the successive tenotomies, each being preceded by a drop, were made at deliberate intervals. The large blunt-pointed scissors, curved on the flat, were next introduced from the nasal side, and with these in position, after thorough sponging, two or three large drops were so instilled as to flow down the blades, one on each side of the optic nerve as a guide. After waiting a minute the optic, and with it the ciliary nerves, were severed at one stroke, during which the patient remained entirely quiet. There was less than the usual bleeding, and the healing was undisturbed. Cocaine maintained its claims as an anæsthetic and hæmostatic.

Dr. G. M. LEFFERTS, of New York, (*Med. News* Nov. 29, '84, p. 597,) reports great relief of the *terrible dysphagia* in advanced laryngeal phthisis by cocaine. The parts were

first carefully cleansed by spray-applications of an alkaline solution, then immediately bathed gently, yet thoroughly, with a four-per-cent. solution by means of a large laryngeal brush. The effect was surprising. "A patient who was slowly perishing more from hunger and thirst than from disease, one application so anæsthetized the acute sensibility, that a full glass of milk was immediately drank with ease and entire comfort. Also the dyspnœa was notably relieved. In a large series of cases the results have always been the same."

Dr. W. C. DABNEY, of Charlotteville, Va. (*ibidem*, p. 613). Case of a boy who *struck* his *eye against hot iron.* Intense pain relieved by cocaine. Examination showed upper part of the cornea milky. Recovery.

Dr. R. J. LEVIS, of Philadelphia, publishes in the *College and Clinical Record*, Dec. 1, '84, p. 258, "notes on the use of cocaine," of which the following may be quoted: "Prior to the applying of nitric acid as a caustic to a syphilitic ulcer of the tongue, the tongue was wiped dry, held protruding between the teeth, and a four-per-cent. solution of cocaine was brushed on. No pain was produced by the caustic on the thoroughly anæsthetized tongue."

Dr. F. N. OTIS, of New York, publishes his experience in *genito-urinary surgery* in the *N. Y. Med. Jour.*, Dec. 6, '84, p. 635. He used it with the greatest advantage in cases of stricture, enlargement of the prostate, irritability of the urethra, stone in the bladder, and ulcer in the rectum. Cocaine made not only the examination painless and easy, but also operations and cauterizations. One remark may be of use for probing the lachrymal duct. He says: "A four-per-cent. solution of the hydrochlorate of cocaine in almond-oil makes an excellent lubricant for urethral instruments, and I think may prove even better than the watery solution for applications to the urethra. Its use in this way, in a few cases, has been very satisfactory."

Dr. R. J. HALL, of New York, communicates (*ibidem*, p. 643) a number of very important experiments. He and Dr. HALSTED injected a four-per-cent. solution of cocaine near or into several nerves, *e. g.*, the ulnar, musculo-cutaneous of

the leg, antero-superior dental, inferior dental, and lingual. They injected from six to thirty-two minims, and found that the tissues supplied by these nerves had become anæsthetic. There was no diminution of muscular power. The anæsthesia was complete until twenty-six minutes after the injection, and sensibility was much diminished for ten or fifteen minutes longer. The introduction of the needle into the ulnar nerve caused quite severe pain, with tingling down the little finger, but the injection gave rise to no sensation. From fifteen to thirty-two minims caused constitutional symptoms. "About six minutes after the injection there was giddiness, at first slight, then well-marked, so that I could not walk without staggering; and finally, there was quite severe nausea, the skin was covered with cold perspiration, and the pupils were dilated. The nausea passed off with the local anæsthesia in about twenty minutes, leaving some dizziness for an hour or so longer."

In a small congenital cyst over the outer third of the left supra-orbital ridge, nineteen minims of a four-per-cent. solution were given hypodermically in divided doses,—one external to the tumor, the others close to the supra-orbital notch. In about five minutes the anæsthesia was relieved. The removal of the tumor, somewhat protracted, was connected with pain only at the last minutes.

"We have used this mode of administration successfully in a number of cases in the Roosevelt Hospital Out-Door Department, and it is obvious that, when the limits of safety have been determined, it may find a very wide application."

Dr. C. H. CASTLE of Cincinnati, reports (*Med. News*, Dec. 6, 1884, p. 662,) on Dr. Rob. Sattler's (Cincinnati) experience with cocaine, which is quite extensive and essentially confirmative of what is stated in the previous reports.

Dr. J. F. CROSTON, of Haverhill, Mass., removed an epithelioma (rodent ulcer) of the cheek under anæsthesia by cocaine, which had been injected underneath.—*Bost. Med. and Surg. Jour.*, Dec. 11, '84, p. 573.

Dr. W. C. JARVIS, of New York, (*Med. Rec.*, Dec. 13, '84, p. 654,) describes several cases of successful *intra-nasal opera-*

*tions* under cocaine anæsthesia, *e. g.*, removal of a horizontal ledge of deviated cartilage; firm, elastic, flesh-like masses filling the nostrils; hypertrophied turbinated tissue, and polypi. In some cases he began the operation with cocaine and ended it with freezing the parts by the spray of rhigolene, a petroleum naphtha, proposed by H. J. Bigelow, of Boston, as a local anæsthetic. (See "Dictionnaire de Médecine," etc., Littré and Robin.)

Dr. D. C. COCKS, of New York (*Med. News*, Dec. 13, 1884, p. 654), *anæsthetizes the iris* after the corneal section either by injecting the solution with a syringe, or let it run along a spatula introduced into the wound. In a few seconds the iris can be withdrawn and the cut painlessly made.

In performing an *enucleation* (Nov. 29th) he first anæthetized the cornea and conjunctiva in the ordinary way, then incised the conjunctiva on the temporal side, separated the subconjunctival tissue as far back as possible, and with an Anel's syringe injected a few drops of a 4 % solution over the tendon of the external rectus. He then divided this tendon, and introducing the point of the syringe as far back as possible, keeping its point near the globe, he injected a few more drops. This was done with each of the recti. The globe was then dislocated forward, the nerve severed, the obliques cut, and the conjunctival wound loosely drawn together with a stich. The patient occasionally felt some pain, but not enough to interfere with the operation. The operation had lasted about half an hour, and during that time the solution was dropped on the eye, or injected into the orbit, every 3–5 minutes. About 3 i ss., *i. e.*, 6 grammes, of a 4 % solution was used. Recovery undisturbed.

The PRESENT WRITER (*Med. Rev.*, p. 656) adds some new observations to his previous communication.

1. *Enucleation of an eyeball under anæsthesia from injecting cocaine into the post-ocular connective tissue.* The conjunctiva was first anæsthetized by instilling the solution. Then the globe was strongly drawn toward the nose by means of a forceps, and six minims of a 4 % solution (pain-

lessly) injected into the orbital tissue close to the posterior part of the globe. Five minutes later the eyeball was removed in the usual way. The divisions of the recti tendons caused slight pain; that of the optic nerve and the dissection of the posterior part of the globe, none or almost none. When the ball was removed, the branches of the toothed forceps were thrust an inch deep through the wound into the orbital tissue, of which the patient felt nothing. The bleeding was scant. Recovery undisturbed.

2. *Ptosis operation after subcutaneous injection of cocaine; anæsthetic effect not very satisfactory.* The tissue was suffused with blood along the track of the hypodermic needle, and the anæsthesia did not reach the upper limit of the region of the operation.

3. *Perforation of the drumhead; cocaine anæsthetizes the walls of the drum-cavity, but not the drumhead.*

4. *Cocaine in cataract operations pre-eminently useful.* Discisions are painless from beginning to end; in extractions only the grasping and drawing out of the iris are moderately painful. The anæsthesia and the temporary anæmia assist the operator in every step of the operation. No bad effect of cocainization on the result of the operation has been noticed; fifteen extractions up to time of writing, Dec. 2d, all doing well.

A week later the present writer *injected* five minims of a three-per-cent solution underneath a *sebaceous tumor* the size of a small walnut, situated in the centre of the *upper lid.* The anæsthesia was almost complete, and the somewhat laborious operation passed satisfactorily [and healed by first intention], but during it the patient [a strong man who never had fainted] became as pale as a corpse, felt somewhat faint, asked repeatedly for drink, and was covered with cold perspiration. In about fifteen minutes this condition of distress, which was, however, in no way alarming, disappeared. The writer sends this observation to the editor of the *Med. Record* as a *word of caution,* and adds that also the patient into whom he had injected cocaine prior to enucleation had become quite pale, but had shown no other unpleasant symptoms. The writer thinks

that injections into the orbit should be made with particular caution on account of the great vascularity of the tissue. In future cases he would begin with injecting no more than one or two drops and gradually feel his way.—(*Med. Rec.*, Dec. 13, 1884, p. 662.)

Dr. F. A. BURRALL (*ibidem*) recommends an alkaline *ointment of cocaine* hydrochlorate for piles.

Drs. G. W. WELD and C. H. SHEARS (*ibidem*, p. 657) have successfully used cocaine anæsthesia in *dental surgery* for removing tartar, extirpating exposed nerve-pulp, preparing sensitive teeth for filling by using the dental engine, etc., incising inflamed gums, and extracting teeth.

Dr. J. R. UHLER, of Baltimore, relates (*ibidem*) that cocaine when freely used upon the rectum, besides benumbing the parts, produced in two cases a rigid tonic *contraction* of the *sphincter ani* and the *longitudinal fibres of the gut*, pulling up the mucous membrane which had previously protruded.

Dr. J. W. STICKLER, of Orange, N. J., (*ibidem*,) publishes the results of injections of cocaine on himself. Once he felt a slight *muscular tremor*, but no other systemic disturbance. "It is interesting to observe that when the hypodermic needle is made to traverse a direct source through the skin and cellular tissue, the hydrochlorate of cocaine does not diffuse itself equally in every direction, but follows quite definitely the channel made for it by the needle, producing anæsthesia along this line, but only to a very limited extent on either side of it." [The writer has found this confirmed in the case of ptosis operation mentioned above.]

Dr. W. H. DOUGHTY, Jr., of Augusta, Ga., reports (*ibidem*, p. 658) a very successful performance of an operation for *vesico-vaginal fistula* under cocaine. There was no tenderness and but slight oozing of blood. When the sensitiveness and the bleeding reappeared, they were dispelled by new applications of cocaine.

Dr. EUGENE SMITH, of Detroit, Mich., (*ibidem*,) alleges that he obtains a more rapid effect from cocaine on the conjunctiva by applying it in the *form of spray* with a hand atomizer than by instillation. He produced total insensi-

bility of the iris in two cases of iridectomy by *injecting with a small lachrymal syringe two drops of a two-per-cent. solution into the anterior chamber.* Three minutes later the iris was seized and cut. *No reaction followed the intra-ocular use of cocaine.*

Dr. F. C. RILEY, of New York, (*ibidem*,) relates two cases (granular lids with intense pannus, perforating ulcer of cornea) in which repeated instillations of Merck's cocaine —which in other cases acted well—*failed to have any effect upon the sensibility of the conjunctiva and cornea.*

Dr. J. M. DA COSTA, of Philadelphia, delivered a lecture before the Philadelphia College of Physicians, December 3d, (published in the *Med. News*, Dec. 13, 1884, p. 651) on "Some observations on the use of hydrochlorate of cocaine, especially its hypodermic use," which contains several statements of importance.

A case of *earache*, which seemed to be neuralgic, was at once relieved by instilling a few drops of a 4 % solution into the meatus. A similar observation was made by the resident physician [name?] in the ward of his colleague, Dr. Hutchinson.

In one instance of neuralgia of the face in which the pain shot into the jaws, painting the gums of the upper jaw with a 4 % solution gave very speedy relief.

Dr. SQUIBB and Dr. JURIST have found that the strength of the solution, as we obtain it prepared, is less than indicated by the druggists, *e. g.*, a 4 % solution is in reality no more than a 3 % solution, owing to impurities, especially resinous substances, in the manufacture of Merck and others.

The most important result of hypodermic injections of about 0.03 grm., is that the pulse invariably becomes fuller and stronger. The vertical line of ascent in the sphygmographic tracing is twice as high as before the injection.

Dr. C. H. WILLIAMS, of Boston, (*Bost. Med. and Surg. Journ.*, Dec. 18, 1884, p. 585,) reports experiments on himself with cocaine subcutaneously, taking in the arm five-and a-half-grain doses at half-hour intervals. Anæsthesia a short distance up and down the arm and to a less distance around it was noticed.

Dr. O. F. WADSWORTH, of Boston, (*ibidem*,) relates the case of a young lady suffering from *headache*, the larger part of which was *referred to the eyes*. In a few moments after placing a drop or two of cocaine on the conjunctiva of each eye, the pain in the eyes was wholly relieved and the headache much lessened.

Dr. A. ALT, of St. Louis, (*Amer. Jour. of Ophthal.*, Nov. 15, issued Dec. 20,' 84,) reports his experience after having used cocaine for a month. In iridectomy, he has several times dropped cocaine on the iris, which he had caused to prolapse, and in a few minutes he found that the excision was almost painless. He thinks that it has a direct influence on the nerves of the blood-vessels. He noticed that it had a decidedly quieting effect on the oscillatory movement of an eye not perfectly blind, and mentions, with great emphasis, its benefit in a case of severe iritis after extraction, which terminated favorably by the benefit derived from cocaine, the solution instilled every few hours having removed pain and anxiety, and given the patient rest.

Dr. W. HUNICKE, of St. Louis, Mo., (*ibidem*, p. 229,) noticed that after instillation of cocaine, the cornea appeared dry, and the reflection from it somewhat diminished. He asks, why?

The paper of Dr. JOHN GREEN, of St. Louis, Mo., (*ibidem*, p. 231,) contains some very valuable observations. In a case of keratit. phlyct., in which the frequent instillation of a one-half-per-cent. solution of atropia during two days had produced only a half dilatation of the pupil, a single instillation of the cocaine solution gave complete relief from pain, and was followed within ten minutes by a dilatation of the pupil nearly *ad maximum*. G. ascribes this to the sedative action of the cocaine, permitting the atropia to have its full effect.

In *iritis* no remedy approaches cocaine in giving full and prompt relief from pain. It is especially efficient as an *adjuvant to atropia*, in dilating the pupil and rupturing adhesions.

In two cases of nystagmus he could confirm Alt's observation, that the movements were considerably quieted by cocaine; in a third they were not. (The present writer used it in four cases,—results negative.)

In "*extraction of cataract* the iridectomy can be rendered painless by producing an artificial prolapse of the iris, and applying a little of the solution to the prolapsed portion. But regarding the safety of the procedure, the occurrence of suppuration in the single case in which I have practised it compels me, for the present, to suspend judgment."

Dr. S. C. AYRES, of Cincinnati, O., (*ibidem*, p. 238,) used cocaine in a case of *bullous keratitis*. The removal of the epithelium, and applying an almost saturated solution of carbolic acid to the cornea on a line marking the boundary of the bleb, produced scarcely any pain. In a case of *granular conjunctivitis with great* photophobia, atropia did not seem to have much influence on the pupil. After getting the full influence of the cocaine, his pupil was widely dilated, and remained so.

The foregoing pages contain every thing on cocaine that has appeared of interest in the American medical literature, as far as it has reached me up to date, Dec. 24, 1884. No doubt a number of valuable contributions have not come to my notice, but the above extracts will give a faithful picture of the enthusiasm, energy, and quickness with which the American mind seizes upon every thing that is of practical importance. I have arranged these extracts in chronological order for two reasons: first, to secure each author the right of literary priority to which he is entitled; secondly, to show the gradual growth of our knowledge on the physiological and therapeutical action of cocaine.

## EUROPEAN CONTRIBUTIONS.

The abstracts from the European literature on the subject, to which I now proceed, will be much shorter, for only very little of it has thus far reached me. Future numbers of the ARCHIVES will keep our readers informed of every thing that is new and important.

The *Revue Générale d'Opthalmologie*, Oct. 31, '84, p. 433, contains an article of Dr. E. MEYER, from which the following extracts are of particular interest. "The instillation of cocaine causes a certain pallor of the conjunctiva, and at the

same time a diminution of its normal secretion, and the tension of the globe appears perceptibly (sensiblement) diminished to the touch. These phenomena, and the dilatation of the pupil, indicate a diminution of the quantity of blood in the ocular vessels, though I have not been able to recognize the same with the ophthalmoscope in the background of the eye."

Dr. AD WEBER, of Darmstadt, writes to Dr. M. "that when the pupil is dilated by atropine, cocaine will enlarge it considerably more, and that by the combination of the two remedies he has seen adhesions of the pupillary border give way that had resisted for weeks the action of atropia alone."

"Cocaine renders the inflamed conjunctiva as insensible as the normal. It seems to exert no injurious influence on the regular recovery of eyes operated on. The diminution of the eyeball tension accounts for the flattening of the cornea after the incision, which has surprised me, and made the expulsion of cortical remnants a little more laborious, but I have not noticed that it prevents a regular coaptation of the wound at the end of the operation."

Dr. E. JELINEK, of Vienna, read a paper on "Cocaine as an Anæsthetic and Analgesic of the Pharynx and Larynx," before the Vienna Med. Soc., Oct. 24, '84, and published in the *Wien. med. Wochenschr.*, Nov. 8 and 15, '84. He says that in Vienna, since Türk, concentrated solutions of morphine had been brushed on the pharynx and larynx, but that cocaine had been used—first by him, and almost simultaneously by Dr. Drvorak—after Dr. Koller had informed them of his experiments with this remedy on the eye. He had to increase the strength of the hydrochlorate (Merck's) to 10 % and 20 % (the latter especially for operations in the larynx), which could be done only by adding alcohol to the water. For the ten-per-cent. sol. he took: Cocain. mur., 1.00; aq. dest., 8.00; alcohol, 2.00. For the twenty-per-cent. sol. the relation is: coc., 1.00; aq. dest., 3.00; alcoh., 2.00. When a concentrated solution or the powder is brought in contact with the mucous membrane, we notice that the sensations of touch, temperature, taste, and pain are diminished, as well as the tenderness on manipulation and the reflex

excitability. He lays stress on the necessity of painting the whole mucous membrane as far as it may come in contact with instruments, for reflexes will be produced if the smallest part has escaped the influence of the remedy. He enters fully into the details of pharyngeal and laryngeal applications and operations, the extensive copying of which would be out of place in THESE ARCHIVES. He praises, in particular, the benefit derived from cocaine in dysphagia accompanying perichondritis—mostly tuberculous—of the epiglottis and larynx. The application of the remedy in one of these cases, with dramatic effect, is related in full, and he adds that in all such cases that had come under his care, thus far, the result has been equally beneficial. His observations are in perfect harmony with those of Dr. Lefferts, mentioned above. For intra-laryngeal operations he uses a strong, hypersaturated watery solution, shaking it, of course, before the application. He further states that two other properties of cocaine will probably prove practically useful, *viz.*: its hæmostatic (anæmisirend) action in contracting swollen portions of the mucous membrane (verified since by Bosworth and others), and its diminishing action on secretion. He has found no injurious secondary effect from its application.

The **English** reports on cocaine have been very cool at first, but more appreciative later. Mr. A. BENSON said at the meeting of the Opthalmological Society of the United Kingdom, Oct. 9, '84: "So far as his experience went the drug was of no appreciable assistance in operations, the anasthæsia being too imperfect." Mr. M. GUNN had used cocaine in three cases, and had come to the same conclusion. Mr. NETTLESHIP had tried it in two cases; it had produced marked anæsthesia without any inconvenience, and he suggested that if the drops were frequently instilled, so as to maintain the effect, the drug might be practically useful.—*Ophthalmic Review*, Nov., 1884, p. 351.

The number of Dec. 6, '84, of the *Brit. Med. Jour.*, has seven articles on cocaine, all more or less appreciative but containing nothing new. It is characteristic of conservative England that medical men were waked up to the re-

markable advantages of a new remedy fully six weeks later than their American brethren, whereas with an equal spirit of receptiveness and progressiveness they ought to have been two weeks before them.

M. VULPIAN communicated his experiments to the Acad. des Sciences, at its meeting on Nov. 18, '84 (*Arch. Gén. de Méd.*, Dec., '84, p. 756, and *Brit. Med. Jour.*, Dec. 6th, p. 1759). When cocaine is injected into the veins of the dog, it is followed by symptoms similar to those produced by electrifying the cervical branch of the sympathetic: protrusion of the eyeballs, dilatation of the pupils, insensibility of the cornea, slight diminution of sensibility in the extremities, and marked increase of the secretion of the submaxillary salivary glands.

Dr. KÖNIGSTEIN, of Vienna, (*Wien. Med. Press.*, 1884, Nos. 42 and 43; *Centralbl. f. Augenh.*, Nov., '84, p. 345,) at the request of Dr. Freud, experimented with cocaine simultaneously with, and independently of, Dr. Koller, obtained the same results, but had not yet arrived at final conclusions when Dr. Koller sent his communication to the Heidelberg Congress. The drug does not seem to act on the peripheral sensitive nerves alone, as many symptoms make it probable that the sympathetic is also influenced.

Prof. J. HIRSCHBERG, of Berlin, (*Centralbl.*, Nov., '84, p. 345,) has used cocaine in thirty-six operations. Among them are seventeen *extractions of senile cataract*, all of which passed normally and recovered "irreproachably." In one case of tattooing a corneal leucoma, the bundle of needles was introduced boldly and obliquely into the scar, and China ink, of syrup consistence, was thoroughly rubbed in with the finger.[1] Pain slight.

Dr. L. HOWE, of Buffalo, experimented with cocaine on animals, under the direction of Prof. Zuntz, in the Zoöphysiological Laboratory of the Agricultural High-School at Berlin. He published in *Fortsch. d. Med.*, ii., No. 22, his results as far as obtained Nov. 15th. The *Centrabl. f. pr. Augenh.* gives them in abstract, of which we will mention

[1] Hirschberg says that in this manner the largest leucoma can be blackened in one sitting. The globe must be depressed by toothless fixing-forceps otherwise the conjunctiva also will be colored.

the following: The action of a 4 % or 5 % solution seems to surpass but little that of a 2 % solution.

After instillations into the conjunctival sac, a considerable quantity of the alkaloid penetrates into the anterior chamber. The aqueous humor drawn with an hypodermic syringe out of the anterior chamber of an eye into which cocaine has been repeatedly instilled, can be used to anæsthetize another eye.

## GENERAL REMARKS.

There is an extensive earlier literature on coca and its alkaloids, of which I shall give only brief extracts, supplementing them by statements taken from the newest literature, so as to give a kind of synopsis of our knowledge on this plant as far as it concerns the physician.

### A.—Pharmacological Notes.

The leaves of Erythroxylon coca (Lamarck) have for centuries been used as a stimulant by the natives of Peru and Bolivia, and they have been warmly recommended and extensively tried for almost all kinds of diseases, but without satisfactory results. In the year 1855 Dr. F. GAEDCKE separated from them, in the laboratory of Dr. Sonnenschein, an alkaloid which he called erythroxiline. He had only two ounces of leaves to work on, but he describes his procedure accurately in the *Archiv der Pharmacie*, vol. cxxxi., pp. 141–150, Hannover, 1855: "The peculiar action of the coca leaves suggested to my mind the supposition that they contained theine, or a body akin to it." He made watery and alcoholic extracts from the leaves, but could not obtain crystals from them by any kind of procedure and reagents, until he subjected them to dry distillation, according to the process which Steynhouse recommends for the discovery of theine. He obtained in the neck of the retort small needle-shaped crystals, distinctly recognizable with the naked eye, made out clearly with a magnifier. The quantity was too small to free a sufficient portion entirely from accompanying products of dry distillation. He could, therefore, not ascertain whether they were identical with theine, nor study their properties. He promised to do this as soon as he could obtain a larger quantity of coca leaves.

In the issue of the *Medical Record* of Nov. 15, 1884, Dr. SAMUEL R. PERCY, of New York, claims priority of the discovery of cocaine, or, as he calls it, erythroxyline. Nov. 4, 1857, he read an exhaustive paper on the leaf of erythroxylon coca before the N. Y. Academy of Medicine. On Dec. 2, 1857, he exhibited to the Academy a scruple of the alkaloid, which he left with the librarian. He stated that the hydrochlorate of erythroxyline had a peculiar but not unpleasant benumbing and paralyzing effect upon the tongue. "The librarian of the Academy has been unable to find the paper or the alkaloid, but the fact of such a paper having been read, is recorded on the books of the Academy."

A thorough and most instructive paper on coca and its chemical analysis was published by Dr. A. NIEMANN, of Goslar, Germany, in the *Vierteljahresschr. für practische Pharmacie*, vol. ix., pp. 489–524, Munich, 1860. He received a sufficient quantity of good coca leaves for examination from Prof. Wöhler, of Göttingen. On Wöhler's request, Dr. Scherzer had bought the leaves in Lima and brought them to Vienna on the Austrian frigate "Novarra," which had made a voyage round the world chiefly for scientific purposes. Niemann investigated the coca leaf thoroughly, separated the alkaloid, which he called cocaine, made several salts of it, the hydrochlorate, sulphate, nitrate, and acetate, studied its chemical reactions, determined its atomic weight, but did not investigate its physiological action, mentioning only that a very diluted, probably too diluted a solution of the hydrochlorate did not dilate his pupil.

M. LOSSEN, 1862, examined cocaine again, and published his results in his Inaugural Dissertation, and in the *Ann. Chem. Pharm.*, 121, 374, and 133, 352. He gave it the formula $C_{17}H_{21}NO_4$; that of Niemann was $C_{16}H_{20}NO_4$. Lossen discovered in the coca leaves another volatile alkaloid, hygrine, which is not yet sufficiently investigated.

A very good compilation of the most important literature and the chemical and physiological action of erythroxylon and its alkaloid is found in "*Die Pflanzenstoffe*," by Husemann and Hilger, p. 881, etc., Berlin, 1882. More or less extensive abstracts from this work are found in some of our medical journals.

An excellent description of coca, with illustrations, is contained in the *Pharmazeutische Rundschau*, New York, Dec., 1884, p. 260, etc., by Dr. Fr. Hoffmann, and an interesting paper is that of Dr. E. R. Squibb, "Cocaine," in his *Ephemeris* of Nov., 1884, p. 685, etc.

The chief manufacturer of cocaine is Merck, in Darmstadt, from whom almost all that has been used thus far was furnished. I have tried a sample given me by Messrs. McKesson & Robbins, of New York, as their own make, which acted as well as Merck's. Parke, Davis, & Co., of Detroit, and others, manufacture it likewise, and their products have been found good.

### B.—Physiological Action.

The foregoing pages contain so much of the physiological action of cocaine that a repetition would be tiresome. Suffice it to say that cocaine acts as an anæsthetic and analgesic on all mucous membranes with which it is brought in contact, the same on the skin and deeper tissues into which it has been injected or to which it has been applied through incisions and wounds. It paralyzes the sensory nerves and the posterior columns of the spinal cord, but not the anterior (Ott, "Cocaine, Veratrum, and Gelsemium," Philadelphia, 1874). The semicircular canals appear particularly affected —disturbances of equilibrium, absence of co-ordination, rotating spasms (v. Anrep, *Arch. ges. Physiol.*, 21, 38, 1880). The pupil is dilated, not ad maximum, and remains responsive to light, though less than normal. The power of accommodation is diminished, not totally suspended. Mucous membranes are bleached and thinned, their secretion is lessened, the tension of the eyeball is diminished. It acts locally on the peripheric sensitive and sympathetic nerve-fibres, and when injected into or near the trunks of sensitive nerves it paralyzes the whole distal part of those nerves (Hall & Halsted, *N. Y. Med. Jour.*, Dec. 6, 1884, p. 643). It causes a diminution of tactile, painful, and thermal impressions, and abolishes reflex irritability. Its action is transient, but can be maintained for hours by repeated application. It has no cumulative effect, and exerts no bad influence on the nutrition of the parts subjected to its action, as far as we can

judge from the observations up to date. Constitutional symptoms after the injection of from five to thirty-five minims and more of a four-per-cent. solution once or several times and even from instillations of a few drops into the conjunctiva (T. R. Pooley) have been noticed. They consisted in headache, dizziness, nausea, unsteadiness of gate, deadly pallor of skin, and cold perspiration. These symptoms were transient, and never had injurious after-effects.

It is easily understood that a substance with such a physiological action will have a wide field of beneficial

### C.—Therapeutical Application.

This is owing to its action :

(1) As an *anæsthetic* and *analgesic* in a great number of painful diseases, irritative conditions, and inflammations of different kinds in many organs, unpleasant methods of examinations, and painful operative procedures. The abolition of reflex excitability, a consequence of the anæsthetic action of the drug, is of the greatest service in many affections, such as photophobia, blepharospasm, headache (reflex), dysphagia, asthma nervosum, and many other kinds of reflex spasms.

(2) As a *vaso-constrictor* (hæmostatic) agent. It will bleach the tissues, diminish hœmorrhage, contract vascular (erectile) tissue in the nose, penis, ear, etc.; thus by enlarging cavities and canals facilitate the introduction of instruments and the inspection, cauterization, and operation of deep-seated parts. It will dilate the pupil, and by its analgesic effect favor and increase the action of other mydriatics.

The *transient nature* of its action makes it particularly valuable when we desire its service only for a short time—for instance, in ophthalmoscopic, rhinoscopic, laryngoscopic, and other examinations; whereas, on the other hand, its action can be maintained at will by repeated applications during operations of longer duration. Its *diminishing effect on secretions* is mentioned by several observers, and will, if confirmed, be of great benefit.

It is of decided advantage as an *adjuvant* to many remedial agents, operative procedures, and the vis medicatrix naturæ; for instance, as an analgesic it will prevent in-

flamed parts from dispelling sleep; it will afford rest—the chief requirement of obtaining primary union of wounds,—and in quieting the nerves of one part, quiet the nervous centres and the mind.

Thus far it has found a useful field of application in:

(1) Ophthalmology.
(2) Otology.
(3) Rhinology, pharyngology, and laryngology.
(4) Genito-urinary surgery.
(5) Gynæcology.
(6) General surgery.

Before concluding this communication I beg to review its

**Particular Use in Ophthalmology,**

as shown in the preceding abstracts and verified by my own experience.

*A.—Operations.*

Cocaine is of the greatest benefit in *cataract-operations*. Divisions of the capsule, primary and secondary, being absolutely painless throughout, can be executed with the necessary precision, without the liability of an accident by an unforeseen movement of the patient. Prolapse of vitreous, entrance of capsule or iris into the stitch canal when the needle is withdrawn, are less likely to occur, on account of the diminution of eyeball tension produced by the drug, and the absence of reflex contraction of the ocular muscles.

The same holds good in extraction. The precision with which every step of the operation ought to be performed is greatly assisted by the absence of pain and the diminution of bleeding. The section, being painless throughout, can be accurately executed as to location, size, and direction. The final cleansing and adaptation of the wound are exceedingly facilitated by cocaine. The patient, having his full consciousness, will turn his eye in every direction desired, while the insensibility of the parts will permit the removal of clots and portions of lens, the reduction of the iris from the corners of the section, and the smoothing of the conjunctival flap without any spasmodic flying off of the ball. The capsulotomy will also be rendered easier and surer by the anæs-

thesia, but it is somewhat more difficult to introduce the cystotome, as the wound does not gape so readily. Frequently the point of the knife wounds the skin near the inner commissure in the progress of the corneal incision. This is felt as the first pain by the patient, and sometimes causes an involuntary movement. This movement may occur also during the iridectomy, which is painful. Knowing the fact, we can prepare the patient and ourselves for its consequences, which need not be of any account, as the pain is but slight. I have not yet dropped cocaine into the wound, nor injected it into the anterior chamber, for I dislike to protract the operation in any way. Apart from all considerations of mischievous bacteria, always and everywhere ready to pounce upon a wound, we can easily believe that the less a wound is exposed to the air, and the less it is manipulated, the greater are its chances for primary union. This shows us another advantage of cocaine; it allows us *to operate quickly, yet with precision.* Its advantage over ether is immense. Ether anæsthesia, if complete, quiet, and uninterrupted during the operation, must in many cases be allowed to pass, before remnants of lens can be removed, and the wound cleansed and adjusted. In many persons the struggling, congestion, vomiting, and unmanageableness when they awake from the etherization, are very unpleasant hindrances to a smooth operation. In cocainization a marked diminution of eyeball tension is often noticed, the cornea wrinkles, and in some cases after the expulsion of the lens, sinks in as if half the eye had been emptied. The expulsion of the lens and of remnants requires more outward pressure, but *wards off accidents*, for the eye is insensible. A consequence of this diminution of pressure, which I have noticed in the majority of cases, is the fact that the iris rarely prolapses spontaneously. This I consider to be an advantage, for we obtain a more regular, key-hole-shaped pupil when we grasp the iris within the anterior chamber than when it lies irregularly folded in the wound.

I have not noticed any injurious effect of cocaine on the healing of the wound. I have made twenty-four extractions under cocaine; twenty-three recovered without disturbance,

one suppurated. This was a case of chronic conjunctival catarrh, with considerable discharge from both eyes the next days after the operation; the patient was a very restless woman, and the operation had not been quite free from complications. I repeated the capsulotomy, and during an unexpected movement of the patient the cystotome slightly grazed the iris.

In iridectomy for *glaucoma* cocaine is of advantage, but requires particular *caution* at the moment of seizing the iris; this being the first and only pain the patient experiences, his eye is apt to make a sudden spasmodic upward movement, which may bring the branches of the forceps in contact with the anterior capsule and rupture it. The patient, as well as the assistant that steadies the eye, ought to be prepared for this emergency. The assistant who steadies the eye with the fixing forceps is liable to hold it very loosely only, because the anæsthetized eye does not move, when on a sudden it feels the pain and flies up. I have made only five glaucoma iridectomies under cocaine, but this movement occurred in two of them, and also in several extractions. Another disadvantage of cocaine was noticed in a case of chronic glaucoma, in which it dilated the pupil *ad maximum*, so much so that the whole iris was concealed under the arcus senilis of the cornea. I had to make the incision without the protection of the capsule by the iris and without seeing either. After the incision the pupil remained dilated, and I had to make the iris prolapse by pressing on the posterior lip of the wound. In another case I made a good-sized corneal incision with a lance-knife, and when I withdrew the instrument the anterior chamber did not empty, the aqueous escaped only when I introduced the forceps. This shows more than any thing else the perfect rest of the eye and its absence of reflex movements on the part of recti and orbicular muscles.

The proper corrective of cocaine mydriasis is a drop of eserine, instilled soon after the cocaine, which will produce a full contraction of the pupil without diminishing the anæsthetic effect of cocaine, even if cocaine is repeatedly dropped in after the eserine. The sensitiveness in iridecto-

my may be eliminated, as has been seen before, by dropping cocaine on the prolapse, or injecting it into the anterior chamber, which can readily be done with E. Meyer's lachrymal syringe. I do not like injecting any fluid into the eye, not even a perfectly fresh, pure solution of cocaine, or one to which an antiseptic has been added. Before I recommend this procedure, I want to have the support of further experience from those that have tried it.

Of a number of diverse *operations on the cornea*, paracentesis, splitting according to Saemisch, abscission of partial or total staphyloma, incising and scraping out pustules or torpid infiltrations, tattooing, removal of deposit of lead or chalky film, removal of foreign bodies, etc., I need not speak in particular. They can all be done under cocaine anæsthesia in the most satisfactory way.

Operations on the *conjunctiva*, extirpation of small tumors, pterygium, symblepharon, and the like are much facilitated by cocaine anæsthesia. It is recommendable in these operations to use a stronger solution, 8 %,—those over 5 % require, of course, a corresponding addition of alcohol,—and instil it on the wound during the progress of the operation.

The same rule ought to be followed in operations on the *muscles and the lids*, *e. g.*, simple tenotomy, advancement, canthoplasty, tarsoraphy, uniting lacerated or incised wounds, scraping or cutting out chalazia and denser tumors, entropium, ptosis, etc. Subcutaneous injections, for appropriate cases, answer very well.

*Enucleation* of the globe can be done either by successive instillations during the operation, according to C. S. Turnbull, or by injecting a few drops into Tenon's capsule along the recti muscles, as D. C. Cocks has done. Both procedures will prolong the operation unduly. Injecting a few drops directly into the orbit close behind the globe has answered me well in one case (see above), and is as follows: when the conjunctiva is anæsthetized by instillation, the eyeball is forcibly drawn toward the nose. This will bring the posterior segment near the outer commissure, from where the hypodermic needle can be introduced, and a few drops—one or two will probably be sufficient—are injected where the ciliary nerves enter the

globe. All this is painless and in two or three minutes the operation can be begun. The division of the recti muscles will be connected with some pain, but the remainder of the operation will not, and there will be very little hemorrhage from the orbit on account of the hæmostatic action of cocaine. From so small an amount of the solution injected no general symptoms of any importance should they occur at all, need be feared. If a drop or two anæsthetizes the cornea and conjunctival sac, then an equal dose will be likely to produce the same effect on the ciliary nerves if injected into the loose cellular tissue of the orbit.

In removal of circumscribed *orbital tumors* injection of a few drops behind them will probably anæsthetize the locality so as to operate painlessly.

In *lachrymal difficulties*, cocaine may be instilled so as to reach the canaliculi, but the deeper parts, sac and nasal duct, can only be anæsthetized by injections with the syringe. Meyer's small syringe will answer best, admitting of the injection being made without slitting the punctum.

In the removal of *foreign bodies from the interior of the eye*, cocainization by repeated instillations into the conjunctival sac is of the greatest advantage. The rest, the absence of reflex motions, and the diminution of eyeball tension produced by the drug, will render prolapse of iris and vitreous less frequent and less extensive, and assist the operator in the correct handling of his instruments. Only a few days ago I saw the benefit of cocaine exemplified in a successful extraction of a splinter of iron with an electro-magnet by Dr. GEO. J. STEVENS, in which operation I had the privilege of assisting.

From the above statements it follows that *almost all operations* on the eye can be performed under cocaine anæsthesia. The rules which I have given in the general remarks are supported by actual experience of other oculists or my own, as will be seen by the abstracts from the current literature in the first part of this paper. Whether that which can be done is under all conditions the best to do, is another question. In children and frightened people, for obvious reasons, there always will bean indication for general anæsthesia. In rare cases the anæsthesia

from cocaine instillations is so superficial that corneal incisions are intensely painful, and ether has to be resorted to. Dr. JAS. A. SPALDING, of Portland, Maine, writes me, that repeated instillations of a three-per-cent. solution, which completely anæsthesized the conjunctiva and cornea for speculum and forceps, in a case of absolute glaucoma, did not prevent the patient from experiencing such intolerable pain at the corneal incision as to make it necessary to complete the operation under ether.

*B.*—The *mode of applying cocaine* will be by instillations, painting the tissue before and during the operation as the case may be, and by injections into the diseased part or its surroundings. In particular cases injecting the solution in or near a nerve-trunk when we want to operate in the region of its peripheric distribution, may prove of advantage. As to the doses we ought to be cautious, for though 1.00 grm. taken internally, in an attempt at suicide, is reported not to have been fatal, unpleasant symptoms have occurred after injections of from six to thirty-six minims of a four-per-cent. solution. Some persons seem to have an idiosyncrasy against the remedy. Aside from my own experience I have heard some of my friends say that injections of five or six minims into the lids produced unpleasant general symptoms. Dr. T. R. POOLEY noticed that two drops of a four-per-cent. solution instilled into the conjunctiva produced in ten minutes such extreme dizziness that the patient, a robust girl, feared to rise from the chair lest she should fall. She did not lose color, nor was their any nausea, but her pupil was widely dilated. She recovered quickly. None of these cases showed alarming symptoms, but we are only at the beginning of our acquaintance with the remedy, and it seems prudent to advance cautiously.

*C.*—As regards the *therapeutic action* of cocaine, I have nothing to add to what I have said above (p. 442). My experience and the publications on that point are too limited as yet to deduct from them any general rules. In a number of cases of acute iritis, I have been able to confirm the benefit of a combined instillation of cocaine and atropine which Koller, A. Weber, J. Green, and others have recommended. The pain was allayed and the course of the inflammation abridged.

# SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE SECOND AND THIRD QUARTERS OF THE YEAR 1883.

By H. MAGNUS, Breslau; C. HORSTMANN, Berlin; and A. NIEDEN, Bochum.

with the coöperation of

C. E. Fitzgerald and Ferguson, Dublin; E. Marckwort and P. von Mittelstädt, Antwerp; Dantone, Rome; Hirschmann, Charkow; S. M. Burnett, Washington; Schiötz and Ole Bull, Christiania, etc.

Translated by Dr. F. E. D'Oench, James A. Spalding, and C. Zimmermann.

## *A.*—GENERAL OPHTHALMOLOGICAL LITERATURE; GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS; NORMAL ANATOMY AND PHYSIOLOGY.

By H. MAGNUS, M.D.

### I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

#### *a.*—TEXT-BOOKS, MONOGRAPHS, TREATISES ON GENERAL BIBLIOGRAPHICAL AND HISTORICAL SUBJECTS.

280. Chauvel. Précis theorique et pratique de l'examen de l'œil et de la vision. Paris, 1883.

281. Gracklauer. Catalogue No. 40. Register of all books and journals on ophthalmology that have been published in Germany from 1867 to 1883. Leipzig, 1883.

282. Magnus. Blindness: its causes and prevention. A vol. of 340 pp. With 33 tables and 7 graphic representations. Breslau, 1883.

283. VERDET-EXNER. Lectures on the undulatory theory of light. First vol., No. 1, Brunswick, 1881. First vol., No. 2. Brunswick, 1883.

284. DE WECKER and LANDOLT. Traité complet d'ophthalmologie. Paris, 1883, vol. iii., No. 1.

GRACKLAUER'S (281) catalogue is apparently intended to be a continuation of the "Bibliotheca Ophthalmiatrica" published by Büchting in 1872; it is, however, so incomplete as to be entirely unsatisfactory.

MAGNUS (282) has endeavored to give an exhaustive review of the subject of blindness. In the first chapter blindness is defined and Schmidt-Rimpler's definition accepted. In the second chapter the result of the official count is shown to be imperfect and a proposal made to determine the number of the blind with greater accuracy. Investigations on the distribution of blindness follow, with discussions on the diseases leading to blindness. Blennorrhœa neonatorum, trachoma, and glaucoma, are the principal causes, followed by the diseases of the cornea and choroid, and atrophy of the optic nerve. In part second the prevention of blindness is discussed, especially general prophylactic measures. The results obtained are clearly presented in numerous tables and graphic representations. One large table shows the causes of blindness expressed in percentage, and has already been published in English by the Society for the Prevention of Blindness.

VERDET'S (283) lectures were published in French by Levistal in 1869–70, and soon gained a prominent place among the text-books on optics. The translation into German by Exner is not merely a translation, but an excellent revision of the French original. Part first contains a geometrico-optical and historical introduction, and the theory of the transmission, interference, and diffraction of light. Part second treats of the interference, of polarized light as elucidated by numerous recent experiments, and double refraction.

### *b.*—STATISTICAL PAPERS.

285. REPORT ON THE EYE AND EAR DEPARTMENT OF ST. MARY'S HOSPITAL, Detroit, Mich., June 1, 1883. 1,616 affections of the eye; 172 operations; 8 extractions. BURNETT.

286. FERGE. Report on one hundred cataract-extractions, with some other communications from practice. Braunschweig, 1883.

287. DOR. 6e rapport annuel de la clinique ophthalmologique de M. le professeur Dr. Dor à Lyon, 1883. 1,267 new patients; 147 operations, 20 of them linear extractions, and 77 iridectomies.

288. FIEUZAL. Bulletin de la clinique nationale ophthalmologique de l'hospice des Quinze-Vingts, vol. i., No. 1. Paris, 1883.

289. HOCK. Report of his private ophthalmic institute from Mar. 1, 1882, to Mar. 1, 1883. *Wiener med. Blätter*, 1883, Nos. 12–16.

290. ANNUAL REPORT OF THE PRESBYTERIAN EYE AND EAR HOSPITAL, Dec. 1, 1881, to Jan. 1, 1883. Baltimore, 1883. 3,229 patients; 53 extractions according to Graefe.

291. KERSCHBAUMER. Fifth annual report of the Salzburg Ophthalmic Institute for the year 1882. Salzburg, 1883.

292. KNAPP. Thirteenth annual report of the New York Ophthalmic and Aural Institute. New York, 1883.

293. MANCHESTER ROYAL EYE HOSPITAL. 67th annual report for 1882–1883.

294. VAN MILLINGER. Ophthalmic Hospital at Constantinople. Reports for 1880 and 1881. Salzburg 1883.

295. PAGENSTECHER. Annual report for 1882 of the ophthalmic hospital for the poor at Weisbaden. Wiesbaden, 1883.

296. SCHIESS-GEMUSEUS. Nineteenth annual report, Jan. 1, 1882 to Jan. 1, 1883. Basel, 1883.

In the appendix to the annual report, DOR (287) discusses a case which Lepine described at a meeting of the soc. de sci. méd. de Lyon. The autopsy of a man was made who had lost his left eye 40 years ago. The left eyeball was atrophic; the optic nerve a mere thread; the chiasma symmetrical; both optic tracts equally thick, but the outer root of the left tractus atrophic. Atrophy and yellowish appearance of the gray fibres which pass to the left from the chiasma to the tuber cinereum. MARCKWORT.

Since 1876 FERGE (286) has treated 7,122 patients and made 436 more important operations. Of 100 extractions 93 gave good, 3 moderate, results; 4 were failures. The section was always made downward.

FIEUZAL (288) had 6,946 new patients in 1881, and performed 737 operations. 228 extractions, section and iridectomy upward: 110 excellent results, 74 good, 17 moderate, and 27 failures.

V. MITTELSTÄDT.

HOCK (289) treated 357 patients and performed 45 operations, 12 of them extractions: 7 good results, 2 moderate, 3 failures.

KERSCHBAUMER (291) treated 2,172 patients in 1882: 595 operations, 94 of them extractions, according to Graefe; 92 of them were entirely successful. Since 1878 658 cataracts were extracted, 609 of them with good, 33 with moderate, success, and 16 failures; there was a loss, therefore, of 2 %.

KNAPP (292) reports on 5,596 patients and 513 operations. 80 extractions according to Graefe were performed, 73 with good, 5 with moderate, success; 2 failures. There were performed: operations on the lens 102, on the iris 61, on the cornea 10, on the sclera 12, on the lids 107, on the globe 27, on the orbit 5, on the muscles 123, on the conjunctiva 16.

3,378 patients were treated and 1,212 operations performed in MANCHESTER (293) in 1882. Extractions according to Graefe 154: 131 with good, 10 with moderate, result. Suppuration of the cornea in 7 cases, of the iris in 2. The successfully operated eye was affected with diseases of the retina, the optic nerve, etc., in 4 cases; 109 enucleations were performed. Sex and occupation of the patients are carefully recorded.

MILLINGER (294) treated 1,760 eye-patients and performed 184 operations, 36 of them extractions according to v. Graefe. Of these 32 obtained good, 2 moderate, vision; 2 were failures. The report also contains a description of diseases of the lachrymal apparatus, most of which are referred to the mucous membrane of the nose. A case of angioma cavernosum is next described, followed by a review of 95 cases of myopia.

PAGENSTECHER (295) treated 1,829 patients and performed 308 operations. Of the 75 extractions 42 were of uncomplicated cataract, 11 of which were extracted in the capsule. 9 good results and 1 moderate result were obtained with this method, one was a failure. 31 cataracts were extracted according to the modified linear method, with 30 good results and one failure. A popular essay on glasses, their use and effect, is appended.

SCHIESS-GEMUSEUS (296) treated 1,589 patients and performed 219 operations. 50 extractions: 48 successful, 2 failures. 444 patients were treated in the hospital. Some interesting clinical histories are reported.

## II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

### *a.*—GENERAL PATHOLOGY AND DIAGNOSIS.

297. BONO. Dell' azione escritata sulla cornea da sostanze aride d'acqua introdotte nell' organismo. *Gazz. delle Cliniche*, vol. xix., 3, 4.

298. DAMSCH. The admissibility of introducing tuberculous masses into the anterior chamber. *Deutsche med. Wochenschr.*, 1883, No. 17.

299. HÖLTZKE. Experimental investigations on the pressure in the anterior chamber. *Arch. f. Ophth.*, vol. xxix., 2.

300. LEFRANC. Contribution à l'étude de la lumière et de la chaleur considérée comme causes de maladies des yeux chez les verriers principalement. *Thèse de Paris*, 1883.

301. MINOR. Experimental keratitis; its bearings on Stricker's theory of inflammation. *Amer. Journ. of Med. Sc.*, July, 1883.

302. MOURA-BRAZIL. La tension intraoculaire dans les races blanche-métisse, noire, et indigène. *Ann. d' ocul.*, March and April, 1883.

According to BONO (297), the percentage of water in the cornea in rabbits, frogs, and criton punctatus varies between 75 and 79 %. The introduction of salt into the system produced a marked reduction in the percentage of water, opacity of the cornea, cataract, and in larger doses, death. DANTONE.

According to DAMSCH (298), the anterior chamber is well adapted for inoculations of tuberculous as well as not tuberculous substances. Spina had maintained the contrary.

According to HÖLTZKE (299) eserine can produce a marked increase of pressure in the anterior chamber, but the myosis caused by it not only neutralizes this increase, but even diminishes the pressure below the physiological mean.

Atropine does not directly increase the pressure, but indirectly by dilating the pupil.

LEFRANC (300) concludes from his investigations in glass manufactories that intense light and great heat are not injurious to healthy eyes, only to previously diseased ones. Adaptation and the kind of flames (in melting glass yellow) play an important part. MARCKWORT.

MINOR (301) concludes from his experiments that Stricker's views in regard to keratitis are not supported by the facts. The corneal corpuscles undoubtedly proliferate, the newly-formed ones being strictly confined to the zone which surrounds the dead corpuscles. The real pus cells are emigrated white blood corpuscles. He thinks Stricker's error must be attributed to the use of one staining method only. Minor employed a method of double staining with nitrate of silver, hæmatoxyline, carmine, etc.

BURNETT.

MOURA-BRAZIL (302) finds that under physiological conditions the intraocular pressure is much higher in negroes than in whites. They are therefore 3-4 times more predisposed to glaucoma. The field of color-perception is greater in natives than in whites.

### *b.*—THERAPEUTICS.

303. CARNO. La desinfecion en oftalmologia. *La cronica oftalm.*, April, 1883.

304. GILLET DE GRANDMONT. De l' action des courants électriques continue appliqués au voisinage du cerveau et des résultats qu' ils produissent en particulier dans l' œil. *Gaz. d' ophth.*, April and May, 1883.

305. SNELL. The electro-magnet: its employment in ophthalmic surgery. London, 1883.

306. VOLTOLINI. The electro-magnet in ophthalmology. *Deutsche med. Wochenschr.*, 1883, No. 20.

307. ZAHL. The usefulness of the magnet in removing chips of iron from the interior of the globe, and report of a case. *Inaug. Diss.*, Greifswald, 1883.

GILLET (304) investigated the action of the descending constant current on the vascular system, the subject of experiment being the frog's tongue spread under the microscope. During the action of the current the arteries enlarged and the blood flowed perceptibly faster.

Gillet examined later the action of the descending constant current on the eyes of rabbits, and found the choroid, iris, and conjunctiva distended and congested. In one animal there were even hemorrhages in the choroid and conjunctiva. The amount of aqueous humor decreased, tension was diminished, and the eye sank farther back into the orbit. In man, Gillet found that the temperature sank 0.2–0.6°, as measured by the thermometer constructed by him. (*To be continued.*) MARCKWORT.

VOLTOLINI (306) first makes the chip of iron magnetic by applying a very powerful electro-magnet to the eye, and extracts it with a smaller one. If the strong magnet can move the foreign body in the eye, an incision only is made, and the chip drawn to the surface with the magnet.

In thirty cases (307) the electro-magnet was used to the greatest advantage; in three, blindness ensued. In ten cases the globe had to be enucleated, either because the operation had failed, or because the eyeball became inflamed or had shrunken after the removal of the chip of steel.

## III.—INSTRUMENTS AND REMEDIES.

### *a.*—INSTRUMENTS AND TECHNICAL CONTRIVANCES.

308. ARMAIGNAC. Nouvel appareil donnant un éclairage d'une intensité variable pour l'examen ophthalmoscopique des sujets atteints de photophobie. *France Méd.*, 1883, p. 512.

309. BERGER. A new refraction ophthalmoscope. *Arch. f. Augenheilk.*, vol. xii., p. 412.

310. BURCHARDT. International test-types. Third enlarged and improved edition. With five photographic and lithographic plates. Kassel, 1883.

311. DUJARDIN. Prothèse oculaire en province. *Rec. d'ophth.*, April, 1883.

312. LANDOLT. Une boite d'instruments. *Arch. d'ophth.*, vol. ii., 4 and 5.

ARMAIGNAC (308) has constructed an apparatus for the ophthalmoscopic examination of photophobic patients, which can be attached to any lamp. Besides an ordinary black screen between the patient and the light there is a smoked glass in front of the flame whose absorbing power can be varied according to the intensity of the photophobia. The light passing through this glass is reflected from the ophthalmoscope into the patient's eye.

MARCKWORT.

BURCHARDT (310) is opposed to the use of letters for testing sight, because persons who read much are more expert than others, because some letters are more easily recognized than others, and because astigmatism materially affects them. Burchardt substitutes dots for letters, and measures vision by the distance at which they are still recognized separately. He defines vision as follows:

"Vision is the power of distinguishing small objects at a comparatively great distance from the eye. It is measured by the ratio of the distance between the objects to their distance from the eye, or the angle subtended by the distance between the two objects at the eye."

DUJARDIN (311) practises in a city in which no artificial eyes are made. In order to obtain by letter eyes which have exactly the desired shape, he cuts out a model in rubber and sends it to the maker. MARCKWORT.

LANDOLT (312) has put together a case of the most necessary eye instruments, with some useful remarks as to their proper shape and size, their care and manipulation.

V. MIDDLESTÄDT.

*b.*—REMEDIES.

313. GRANVILLE FAUGHT. Boroglyceride. *Med. News*, vol. xlii., p. 21.

313*a*. WEBSTER FOX. Boroglyceride in the treatment of diseases of the eye and ear. *Med. News*, vol. xlii., p. 21. The boroglyceride is a combination of boric acid and glycerine, and Fox has found it useful in all affections of the eye in which an astringent or antiseptic is beneficial. The method of preparation is given by Dr. Faught in the same number of the *News*.

BURNETT.

## IV.—ANATOMY.

### *a.*—GENERAL ANATOMY.

314. GIRO. Contribution à l' étude de certaines formes de persistance de la membrane pupillaire simulant des synéchies d'origine pathologique. *Thèse de Lyon*, 1883.

315. MAGNUS. Six cases of anophthalmus and microphthalmus congenitus. *Arch. f. Augenheilk.* vol. xii., 3.

316. SCHWALBE. Text-book of the anatomy of the organs of sense, vol. ii., 3. Part of Hoffmann's text-book of human anatomy. First number. Erlangen, 1883. The greater portion of this excellent book has already been discussed. The muscles, lids, and lachrymal organs still remain to be described.

### *b.*—REFRACTIVE MEDIA : RETINA AND CHOROID.

317. LAMHOFER. Venous pulse of the retina. *Inaug. Diss.*, Leipzig, 1883.

LAMHOFER'S (317) thesis is mainly critical; all hypotheses thus far put forward in regard to the venous pulse of the retina are discussed, among them also the latest theory of Helfreich, which is considered untenable. The theory of Coccius he thinks best explains the facts.

### *c.*—OPTIC NERVE AND CENTRAL ORGANS.

318. BECHTEREW. The course in the brain of the nerve fibres contracting the pupil, and the localization of a centre for the iris and contraction of the muscles of the eye. *Arch. f. d. ges. Physiol.*, vol. xxxi., 1 and 2.

318*a*. BECHTEREW. The localization of a centre governing the movements of the pupil. Reported at a meeting of the society of Russian physicians at St. Petersburg, *Wratsch*, 1883, No. 15.

319. DEUTSCHMANN. The semidecussation in the chiasma of man. *Arch. f. Ophth.*, vol. xxix., 1.

320. HENSEN. Remarks on Bechterew's paper: The course in the brain of the nerve fibres contracting the pupil. *Arch. f. d. ges. Physiol.*, vol. xxxi., Nos. 5 and 6. Bechterew had incorrectly quoted the statements of Hensen and Völckers, and these mistakes Hensen rectifies.

BECHTEREW'S (318) results are as follows: 1, There are no reflex fibres contracting the pupil in the optic tracts or their central termination in the corpora geniculata and quadrigemina of higher animals and the corpora bigemina of birds. 2, Such fibres pass from the retina through the optic nerve, enter the gray substance surrounding the third ventricle directly behind the chiasma, and thence the nuclei of the oculomotor nerve, and return to the periphery in this nerve. 3, The fibres contracting the pupil remain uncrossed throughout their whole course in the gray substance. 4, Each eye has its own reflex arch, which passes through the optic nerve, the corresponding half of the central gray substance, the nucleus and trunk of the oculomotor nerve of the same side. 5, Between the two arches there is a connection, by means of which the reflex is transmitted from one eye to the other. This connection is probably established by commissural fibres passing from the nucleus of one oculomotor nerve to that of the other. 6, The centres of the reflex contracting the pupil are at the bottom of the third ventricle, not behind the corpora quadrigemina, but probably in the nuclei of the oculomotor nerves. 7, There are no centres for the muscles

of the eye at the bottom of the third ventricle. 8, The centres controlling the voluntary movements of the eyeballs must lie in the nuclei of nerves supplying the muscles. 9, The localization of a centre of accommodation at the bottom of the third ventricle has not yet been definitely determined.

According to BECHTEREW (318*a*.) the course of the fibres contracting the pupil is as follows: They pass with the optic nerve, uncrossed through the chiasma, into the brain (longitudinal division of the chiasma does not affect the pupils). In the brain they pass on at the sides of the third ventricle into the nuclei (destruction of one side of the third ventricle produces dilatation of the pupil of the same side). The fibres contracting the pupils by reflex action must communicate; the connection takes place in the centres themselves. In regard to the dilatation of the pupil as the result of pain, Bechterew denies its dependence upon the sympathetic nerve, and explains it by assuming a depressing influence on the centres of pupillary contraction. HIRSCHMANN.

DEUTSCHMANN (319) found atrophy of both tracts in unilateral atrophy of the optic nerve; just before the chiasma the atrophy was no longer total but only partial, and more marked in the crossed than the uncrossed tract.

### *d.*—COMPARATIVE ANATOMY.

321. GRÜNHAGEN. The nerves of the ciliary processes of the rabbit. *Arch. f. microsc. Anat.*, vol. xxii., 3.

322. HOFFMANN. The comparative anatomy of the lamina cribrosa of the optic nerve and its surroundings. *Arch. f. Ophth.*, vol. xxix., 2.

323. STRICKER. The light-perceiving apparatus of the retina, Sitzng. der K. K. Ges. d. Aerzte in Wien, March 30, 1883. *Wiener med. Presse*, No. 14.

According to GRÜNHAGEN (321) the ciliary processes of the rabbit probably contain an end plexus of ganglion cells of the trigeminus.

STRICKER (323) found a very peculiar condition of things in a tiger and leopard. The layer of rods and cones was entirely wanting, its place being taken by a broad granular layer. The animals had seen well during life.

## V.—PHYSIOLOGY.

### *a.*—GENERAL PHYSIOLOGY.

324. EMERY JONES. The effects of the electric light on the

eye. *Ophth. Rev.*, vol. ii., April 18th. Observed inflammation of the eye due to electric light.

325. MATTHIESSEN. The form of the astigmatic images of very small straight lines by oblique incidence of the rays into an infinite segment of a refractive spherical plane. *Gr. Arch. f. Ophth.*, vol. xxix, 1.

326. MENGEAND. Conséquences favorables à l'hygiène de la vue que l'on pourrait retirer de l'éclairage des lampes à incandescence. *Rec. d'ophthal.*, Sept., 1883.

327. URBANTSCHITSCH. Contributions to the knowledge of the sensations of the nerves of special sense. *Wien. med. Presse*, No. 17, 1883. Treats of the remarkable dependence of the faculty of vision (inclusively color-perception) of one eye on that of its fellow.

According to MENGEAND (326) the lamp of Edison spares to the media in front of the retina, the absorption and diffusion of the ultraviolet rays; for this and other reasons it is to be recommended.

### *b.*—RETINA AND CENTRAL ORGANS.

(Translated by J. A. SPALDING, M.D., Portland, Maine.)

328. BUTZ. Investigations into the physiological functions of the retina. *Inaug. Dissert.*, Dorpat, 1883.

329. STOEBER. Du champ visuel simple ou achromatique et de ses anomalies. *Arch. d'ophth.*, tom. iii., part 3.

According to BUTZ (328) the retinal elements which lie near the ora serrata on the temporal side also are capable of perception; only in this district a much greater intensity is needed in order to produce a sensation of light. Excitation of the centre of the retina produces or is followed by a contraction of the V. F., a phenomenon which can be explained partly by a diminution in the size of the pupil, and partly by the fact that with increased energy on the part of the centre of the retina the potential activity of the periphery of the retina is proportionally diminished. Whenever greater demands than usual are made upon the accommodation of the eye, the limits of the V. F. enlarge in all directions. The capacity of distinguishing two separate points from one another decreases toward the periphery of the retina, but not with equal rapidity in the various meridians. The limits of perception extend farthest toward the outer side of the V. F., which corresponds,

as is evident, to the inner halves of the horizontal meridian of the retina. Upward, the limits of the field are most contracted, in correspondence with the lower halves of the vertical meridian of the retina. The limits are about of equal extent toward the external halves of the horizontal and the upper halves of the vertical meridian of the retina. The same results, which in these experiments were obtained with points, are also obtainable with letters; but there is at the same time a difference, in that the smaller letters can be distinctly recognized at an equal distance from the macula lutea in all directions of both meridians. The peripheral acuteness of vision can be increased to a marked degree by proper exercise; various letters can be seen to a much greater distance after satisfactory practice than they could have been seen before. All colors lose a certain amount of tone when removed from perception by the centre of the retina, becoming first more hazy, then undecided in tone, and finally passing over into other colors—*e. g.*, red becomes yellowish; green, likewise yellowish; while violet becomes distinctly gray. At the outermost limits of the V. F. all colored objects lose on the whole their color, and are merely recognized as objects without any special tint. These alterations are most distinctly marked on the temporal side of the retina. The after-images in the periphery of the retina are less intense than in the centre, persist for a less length of time than the central after-images, and finally enjoy a different color from those observed in the central portions of the retina. The sensitiveness for light of every wave-length increases from the centre of the retina toward the periphery as far as 30°, while from 30° outward it decreases with greater or less rapidity for various tints of light. The increase of sensitiveness varies also with the various colors; in the extreme periphery it is most marked for violet, least of all for red.

### *c.*—COLOR-PERCEPTION.

330. KROLL. On the cultivation of the color-sense. *C. f. A.*, 1883, p. 243.

331. MINOR. A case of green blindness. *American Journ. Med. Science*, April, 1883.

332. MOYNE. On the examination of the acuteness of vision and color-sense in railway employés and sailors. *Annal. d'ottal.*, vol. xiii., part 1.

333. SHUFELD. Unilateral Daltonism. *Medical Record*, 1883, No. 9. The left eye was red-blind.

The patient examined by MINOR (331) laid together the bright-greens, greens, grays, brownish-yellows, dark-yellows, and light-browns of Holmgren's test. The second test, with purple and rose, showed no confusion, nor did the third, with the red wool. Unfortunately no test could be made with the continuous spectrum. It would have been extremely interesting to see what the patient would make of green by this method. MINOR endeavors to explain the Young-Helmholtz theory in this way: the retinal elements perceptive of green had lost so much of their activity that they could only be excited by simultaneous action of those elements which are created for the perception of red and blue. The elements for red and blue are present in a larger number than in the normal condition. In this way originates a mingled perception which represents a color-zone, in which the patient confuses green and all the colors derived from green. If this explanation be correct, a very intense green ought to have been distinguished. At all events the observation is in strong opposition to Hering's theory. BURNETT.

MOYNE (332) did not discover a single case of congenital Daltonism amongst 150 railroad employés, while in the same men he discovered ten cases of acquired Daltonism after the abuse of alcohol and tobacco.

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## *B.*—ANOMALIES OF REFRACTION AND ACCOMMODATION, LIDS, LACHRYMAL APPARATUS, MUSCLES AND NERVES, ORBIT AND ADJACENT CAVITIES, CONJUNCTIVA, CORNEA SCLEROTIC, ANTERIOR CHAMBER.

BY DR. HORSTMANN.

### I.—ANOMALIES OF REFRACTION AND ACCOMMODATION.

334. TCHERNING. Studies on the etiology of myopia. *Graefe's Arch.*, Band xxix., 1, page 201.

335. REICH, M. Alterations in the refraction of eighty-five scholars observed during a period of six years. *V. Graefe's Archiv*, Band xxix., 2, page 73.

336. DANIEL. On the influence of age upon the proportion of manifest and total hypermetropia. *Inaug. Dissert., C. f. A.*, Band vii., page 193.

TCHERNING's results (334) are based upon the examination of 9,567 persons, 7,523 belonging to the military recruiting contingent, and 2,044 being observed at Hansen's clinique in Copenhagen. In his opinion there are three varieties of myopia, the first of which, the weakest degree, is either congenital or acquired up to the age of twenty-five. For this form there does not appear to be any especial cause, neither close work of the eyes, nor diseases within the eye, although there may be an hereditary disposition. Vision is generally good, and the fundus of the eye is either entirely normal or exhibits a very small crescent. The second form is the result of close work and is especially frequent amongst the educated classes. It very rarely reaches 9 D, and averages about 4 D. The third form, which fortunately for the human race is rare, must be looked upon as a genuine disease. In this class are included those excessive degrees of myopia, higher than 9 D, which are scattered with great uniformity amongst all classes of people without any especial regard to their occupation. These form at the highest about one per cent of the population. This type depends evidently and always upon elongation of the ocular axis ; those extremely large myopic eyes occasionally observed during autopsies, belong to this category. In this class heredity plays a rôle, although perhaps less than in other forms of myopia. As a rule, it appears at a very early age and advances so rapidly that by the time the patient has reached his twenty-fifth year 9 D has been passed. It is a disease *sui generis*. Myopia caused simply by reading is benignant, and appears to be nothing but an accommodation of the eye to its work. It is extremely doubtful whether any dangerous myopia can develop itself from this latter class.

REICH (335) had examined 145 high-school scholars some six years previously and now had an opportunity of re-examining eighty-eight of them. While in 1876, the emmetropes composed thirty-five per cent., the myopes twenty-five per cent., and the hypermetropes thirty-six per cent. of the whole, he now discovered forty-three per cent. of emmetropes, fifty per cent. of myopes, and three and four tenths per cent. of hypermetropes. The remainder suffered from amblyopia. The most notable points were, that out of thirty-two cases of hypermetropia twelve had become myopic ; of thirty-two emmetropes fourteen had become myopic, while of twenty-two myopics, eighteen had become more strongly myopic. The ophthalmoscopic examination had shown twenty-four

per cent. of crescent six years ago, while at the re-examination the percentage had increased to sixty.

DANIEL (336) found that the relation of manifest hypermetropia to the total in uncomplicated cases is at the age of from 6 to 15 as 1 to 3; from 16 to 25 as 1 to 2; from 26 to 35 as 2 to 3 or 3 to 4; from 36 to 45 as 1 to 1, and from 45 onward always as 1 to 1. This examination consequently shows that from the age of 6 to 15 two thirds of the hypermetropia is latent; from 16 to 25 one half; from 26 to 35 one third to one quarter; while from 36 to 45 and beyond, the entire hypermetropia is manifest.

## II.—LIDS AND SURROUNDINGS OF THE EYES.

337. MITTASCH. The syphilitic diseases of the eyelids. *Inaug. Dissert.*, Würzburg, 1883.

338. DE VICENTIIS. On xanthelasma. *Annal. di Ottal.*, vol. xii., 1.

339. HALTENHOFF. Observations d' ankyloblépharon et symblépharon cornéo-conjunctival étendus, suite de brûlure. Three operations. Successful skin-grafting. *Rev. de la Suisse Romaine*, 1883, p. 149.

340. BOCK. The transplantation of skin and mucous membranes in ophthalmic surgery. Vienna, 1884.

341. NICATI. Notes in ophthalmic surgery. Distichiasis, trichiasis, and entropium; differential diagnosis and operative indications. *Archiv. d'ophthal.*, tom iii., part 5, p. 1.

342. CUIGNET. Greffe conjunctivale. *Rec. d'ophth.*, Sept., 1883.

343. COLIN. Nouveau type de cautère Paquelin. *Gaz. des hôpitaux*, 1883, page 437.

344. BRIÈRE. Kyste dermoid congénital de l'œil. *Soc. de Chirurg., Compte rendu*, 25th Avril, 1883.

MITTASCH (337) describes the syphilitic affections of the eyelids. He first mentions the syphilitic initial sclerosis. Indurated chancre of the lids is of very rare occurrence. Its favorite locality is at the inner canthus. The infecting ulcer either arises from the outer skin of the eyelids, and subsequently attacks the lachrymal caruncle and plica semi-lunaris, or *vice versa*. Amongst the secondary syphilitic affections of the skin of the lids, the slighter forms of the exanthema generally form a partial symptom

of the general eruption upon the skin. Their favorite situation, like that of the primary ulcer, is at the external margin. They generally cause a transitory loss of eyelashes. Syphilitic papillæ, the syphilitic ulcer, and the gumma are also now and then observed. In conclusion, a case of tarsitis syphilitica is carefully described.

According to DE VICENTIIS (338) xanthelasma is not, as has hitherto been generally asserted, a simple hypertrophy of the connective tissue with deposits of pigment, but a genuine neoplastic formation of endothelial elements, in which the cells are filled with a fatty mass to which the neoplasm owes its peculiar fatty-yellow tinge. In the two cases in which the author subjected his material to a careful examination, the xanthelasma in one case was entirely elevated above the level of the skin, whilst in the other the elevation was nodular.

BOCK (340) publishes the results which have been obtained in Stellwag's clinique in cases of transplantation of skin-flaps without a pedicle. This operation was performed in every case, in which the aim of the surgeon was to compensate for losses of substance in the adnexa of the eye or to cure deformities, when the simple shifting of flaps did not suffice. In doing this both external skin-flaps and flaps of mucous membrane were transplanted. The transplantation was performed after the extirpation of neoplasms on the lids, in cases of malformation of the lids, but chiefly in cicatricial ectropium, as well as in cases of symblepharon and cicatrices of the conjunctiva. In almost every case the skin was taken from the left arm of the patient, but as little as possible of the subcutaneous tissue left with it. The flaps were divided into small pieces, and several were used to cover the defect, because they could be much better adapted to the new surfaces, and accommodated themselves bette to the form of the loss of substance. Defects in the mucous membranes were compensated for by bits of mucous membrane from the vagina. The latter were, however, invariably transplanted *in toto*, since small pieces were easily and rapidly thrown off from the conjunctival sac, or at least completely disarranged by the nipping together of the eyelids.

HALTENHOFF (339) has successfully transplanted a piece of conjunctiva from a rabbit in a case of anchyloblepharon and symblepharon due to a burn.

CUIGNET (342) reports a case of symblepharon in which he severed the connection, and transplanted upon the denuded sur-

face a piece of mucous membrane removed from the cheek of a rabbit; the piece which was held in position with sutures attached itself perfectly. He succeeded in this manner in restoring a conjunctival sac of about one half of the normal size. A year later, the condition of the eye had not only not deteriorated but had even improved, for all irritation had ceased.

NICATI (341) operates on congenital distichiasis by excision of the skin at the edge of the lid thus affected. In trichiasis of the lateral portions of the edges of the lid, he recommends Watson's *method* under the name of "*lateral marginoplasty.*" In cases of trichiasis of the middle or of the whole of the margin of the lid, a skin-flap parallel to the edge of the lid is pushed through a button-hole made at some distance from the edge of the lid, and the ciliary margin of the lid is carried upward ("*median marginoplasty*"). Entropium, when stationary, is operated upon by Snellen's or Streatfeild's method; in other cases by advancement of the tendon of the levator palp. sup. The tendon (the eyelid being everted) is seized in a noose from the conjunctival side, and separated from the cartilage, while after the latter is separated from the orbicularis the tendon is fastened to the anterior tarsal margin by carrying the thread between the tarsus and the orbicularis, pushing it through at the margin of the lid and tying it over a button. V. MITTELSTÄDT.

Poncet read a paper by BRIÈRE (344) at a session of the Chirurgical Society, April 25, 1883. A tumor rested upon the left cheek, and by means of a cord was attached to the eye, the inner half of which alone was fully developed. Microscopic examination showed that the tumor was composed of elements of the skin, and was partly in a state of embryonal development.

### III.—LACHRYMAL APPARATUS.

345. TARTUFFERI. A method of filing out strictures in the naso-lachrymal canal for the cure of chronic dacryocystitis. *C. f. A.*, 1883, p. 258.

346. FIORI. Dilatation of the lachrymal passages. *Annali di Ottal.*, vol. xii., 1.

347. MAGAWLY. Operations for lachrymal fistulæ. *St. Petersburg. med. Wochensch.*, 1883.

348. RAMPOLDI. A new cause of mydriasis. *Annali di Ottal.*, vol. xi., 6.

349. KIPP. A case of tear-stone in the canaliculus of the lower lid. *Med. Record*, Sept. 15, 1883.

350. BOCK. A case of sarcoma of the lachrymal gland. *Wiener med. Presse*, 1883, No. 33.

351. HARLAN. Sarcoma of the lachrymal gland. *Transactions Amer. Oph. Soc.*, 1882.

352. EVERSBUSCH. On some alterations in the plica semilunaris. Munich, 1883.

353. HOADLEY-GABB. Hemorrhage from the nose and lachrymal canal. *British Med. Journal*, April 14, 1883.

354. HOCK. Traumatic cyst in the lachrymal region; extirpation; cure. Report of his private clinique, Vienna, 1883, p. 15.

TARTUFFERI (345) files or scrapes away the neoplastic or hypertrophic tissue in cases of contraction or stricture of the lachrymal canal, and especially in such obstructions at the upper orifice of the canal, or even when the latter has closed, which frequently happens in cases of chronic dacryocystitis. He employs for this purpose a fine steel rod which terminates in a small olive $1\frac{1}{2}$ *mm.* long, and $\frac{3}{4}$ *mm.* in diameter. He follows up the olive, which is merely used as a guide, with a second one which is provided with spiral grooves. By turning the instrument upon its axis the desired effect is produced.

FIORI (346) employs an instrument constructed somewhat after the fashion of urethral dilators, for enlargement of constricted naso-lachrymal passages. Two concave sounds soldered together at the tip (corresponding when closed to the No. 2 probe of Bowman's scale) are passed through the lower canaliculus after it has been slit up. When the point has reached the nasal end of the lachrymal canal the two hollow sounds are spread apart by common lachrymal probes, the thickest of which has a diameter of 3 *mm.* A small ring with a hand-screw regulates the distance to which the two branches can be separated. After one or two dilatations of the passage in this manner, the cure is completed by the introduction of the common probes. Fiori has already had the best of results in twenty-seven cases treated by this method.

DANTONE.

MAGAWLY (347) was so unfortunate as to see his Weber beak-pointed knife break off in two separate cases and to remain firmly fixed in the nasal portion of the lachrymal canal. In the first case

the beak and a portion of the blade remained in the canal, became encapsuled and caused no trouble. In the other a dacryocystitis with lateral lachrymal fistula ensued. Magawly made an incision in front of the supposed locality of the blade, but could not discover it. Later he extracted it by means of a powerful electro-magnet.

RAMPOLDI (348) observed mydriasis while probing the lachrymal canal. He thinks that some irritation of a branch of the sympathetic, which lies in this neighborhood, must have caused so curious a phenomenon.

BOCK (350) observed on the left upper eyelid of a healthy man a tumor which extended from the middle of the orbital margin to the external canthus. The tumor was not connected with the globe, and could be moved about independent of the lids. On everting the lid the growth protruded from the upper conjunctival fold in the shape of a bright-red mass as large as a bean. It was extirpated, and under the microscope was discovered to be a small-cell, round-cell sarcoma, together with remants of the infiltrated tissue of the lachrymal gland.

HARLAN (351) has also seen a tumor of the lachrymal gland as large as a hen's egg. This also proved to be a spindle-cell sarcoma.

Alterations of the semilunar fold of the conjunctiva and of the adjacent lachrymal caruncle have hitherto been rarely mentioned. EVERSBUSCH (352) describes a cartilaginous formation and an angioma of the plica semilunaris, as well as hypertrophy of the same, which depended upon syphilitic infection.

HOADLEY-GABB (353) saw a case of epistaxis demanding an anterior tampon, after violent coughing, by a man who had heart disease. Two hours later the blood escaped from the right canaliculus.

HOCK (354) removed from the region of the right lachrymal gland a cyst as large as a walnut, which evidently originated from a blow from a horse's hoof, which disfigured the entire neighborhood and produced persistent lachrymation.

## IV.—MUSCLES AND NERVES.

355. FONTAN. Paralysie simultanée des deux moteurs oculaires communs par nicotisme. *Rec. d'ophth.*, tom. iii., 6, p. 309.

356. WESTPHAL. On total paralysis of the ocular muscles in

the demented. *Jahreszeitung des Vereins der Irrenaerzte*, Berlin, 1883.

357. GUTMANN. Diabetic abducens-paralysis. *C. f. A.*, 1883, page 299.

A man who had smoked excessively for a long time, and of late had drank a large amount of alcohol, consulted FONTAN (355), who discovered that suddenly one morning, just after arising, the patient had perceived a paralysis of the rectus internus of the right eye, and in the left eye a paralysis of the levator palpebræ, rectus superior, internus, inferior, and obliquus inferior. The nerves of the sphincter iridis did not appear to be paralyzed on either side; but they were partially irritated, for the pupils were remarkably contracted when the patient looked at the light, while if a shadow was thrown over them they did not enlarge to any great extent. A diminution in the amount of tobacco smoked was followed by a decided improvement. Fontan expresses the opinion that the chief cause of the paralysis was the abuse of tobacco, while to the alcohol he attributes an inferior influence. "Is contraction of the pupil, which has been repeatedly noticed without any explanation (Claude Bernard, Carré) in paralysis of the third pair, a satisfactory symptom in the diagnosis of nicotine poisoning? I believe that we should pay considerable attention to this point, and that new facts will satisfactorily solve this interesting question." MARCKWORT.

WESTPHAL'S investigations (356) demonstrate in the insane, and especially in paralytics, a progressive form of paralysis which attacks all of the ocular muscles and finally leads to total fixation of the globe. The ophthalmoscope generally shows atrophic degeneration of the optic papilla. Disturbances are also noticed in other motor nerves.

GUTMANN (357) publishes a case of paralysis of the abducens in a diabetic patient. The symptom disappeared entirely after visiting the Carlsbad Springs.

## V.—ORBIT AND ADJACENT CAVITIES.

358. SÉDAN. La tenonite rheumatismale. *Rec. d'oph.*, 1883, 337.

359. HOCK. Tenonitis. *Bericht.*, 1883, p. 17.

360. GRADENIGO. Massage in ocular therapeutics. *Annali di Ottal.*, vol. xii., 1.

361. PANAS. Les exostoses fronto-orbitaires. *Arch. d'ophth.* tom. iv., p. 289.

362. NOYES. Ocular tumors. *Transact. Am. Oph. Soc.*, 1882.

363. MCKAY. Non-pulsating exophthalmus with recurring thrombosis of orbital veins. *Trans. Am. Oph. Soc.*, 1882.

364. GLASCOTT. Case of traumatic aneurism of the left orbit, cured by compression of the carotid artery of the same side. *Ophth. Rev.*, vol. ii., p. 193.

365. EALES. Uniocular reflex; iridoplegia associated with necrosis of the orbital roof on the same side and with double optic neuritis. *Ophth. Rev.*, vol. ii., p. 225.

366. LUBRECHT. A case of pulsating exophthalmus. *Deutsche med. Wochensch.*, 1883, No. 35.

SÉDAN (358) observed an enormous swelling of the lids in a patient who suffered from rheumatism, and who applied to him at first for violent headache, without any visible alterations in the eyelids or globe. He scarified the lids at the external commissure, and saw a decided improvement after persistent slow exudation of a serous fluid. MARCKWORT.

367. HARDY. *Goître exophthalmique. Gaz. des hôp.*, 1883, 433.

HOCK (359) has repeatedly seen cases that cannot possibly be regarded as any thing else than idiopathic tenonitis. Berlin does not recognize any such disease, and declares that the symptoms of the disease in question are either a link in the chain of symptoms in a retrobulbar inflammation of the cellular tissues, or else of a subconjunctival abscess. In a recent case the symptoms were swelling of the lids, extraordinary œdema of the conjunctiva of the eyeball, and violent pain on moving the globe. The inflammation disappeared under the influence of warm poultices. Hock assures us that this was a case of tenonitis, because there was no protrusion of the eyeball during the entire duration of the affection. An inflammation of the retrobulbar cellular tissue is consequently excluded. The preservation of perfect vision argues in favor of the integrity of the deeper-lying portions of the eye. In subconjunctival abscesses the mobility of the eyeball is never disturbed.

GRADENIGO (360) resorts to massage not only in diseases of the lids, but in those of the eyeball which are associated with increased intraocular pressure. Massage was of great help to him, in addition to other cases, in a case of severe tenonitis, in which the eyeball protruded to a marked degree and was totally immov-

able, the cornea had lost its sensibility, and the retina even quantitative perception of light. DANTONE.

PANAS (361) performed an operation upon a girl of eighteen years, for an exostosis of the right orbit, which made its first appearance five years before, had since grown slowly, and had already been subjected to two operations, the result of which was a permanent orbital fistula. The tumor, which was fully as large as a hen's egg, occupied the region of the right eyebrow, and extended to the left eyebrow and to the bridge of the nose. Situated as it was so deeply in the orbit, the precise dimensions of the tumor could not be accurately ascertained. The eye which had been pushed very much forward, downward, and outward, possessed merely quantitative perception of light. The optic papilla was atrophic, but the other parts of the eye relatively normal. The skin was anæsthetic only over the region of the supra-orbital nerve ; the sense of smell on the right side was blunted. Cerebral symptoms were absent. Panas thought that he could easily remove the tumor by a broad opening in the frontal sinuses, but had to be satisfied with resection of the orbital part of the tumor, since the entire frontal sinus was filled with compact bony tissue. Death followed six days later from meningitis caused by purulent phlebitis. At the post-mortem examination it was seen that the neoplasm had originated in the orbital wall of the frontal sinus, and extended into the orbit, the ethmoid bone, the frontal sinuses of the opposite side, and then into the cranial cavity. Panas argues against the generally accepted opinion that such operations as these are not dangerous. But to this we have simply to reply that according to Berlin's statistics in Graefe-Saemisch (Band vi., part ii.,) the mortality in operated exostoses of the upper wall of the orbit is thirty-eight per cent. S. MITTELSTÄDT.

NOYES (362) removed a spindle-cell sarcoma which originated from the periosteum of the orbital floor and extended to the inner half of the lower lid and the conjunctiva of the lower part of the globe. The eye was preserved with a moderate amount of vision. A relapse occurred in the præauricular region, and the patient died in six months. BURNETT.

MCKAY (363) observed protrusion of an eye in a woman, æt. twenty-eight, who asserted that she had observed the symptom for ten years. During several years it grew very slowly yet gradually, and was generally larger during the menstrual period. No injury in that region could be recalled to the patient's mind.

The right upper lid was dark-red and tense. The eyeball protruded ¾ of an inch farther forward than the other. Varicose veins were quite noticeable at the inner upper angle of the orbit. The conjunctiva of the lower lid was thickened and showed symptoms of engorgement. The movements of the eyeball appeared impaired in all directions, especially inward and upward. The refractive media were clear. Hm. S = $\frac{1}{30}$, optic papillæ grayish. No cyst could be discovered, nor did the protrusion appear to decrease by compression of the globe itself or of the carotid artery. Optic neuritis and necrosis of the cornea followed. Enucleation was performed. Three successive thromboses were discovered in the orbital veins. These veins became finally obliterated, while the orbit continued moderately normal.

BURNETT.

GLASCOTT (364) describes a case in which exophthalmus followed a blow on the left side of the head. A large, strongly pulsating vessel was discovered at the inner and upper angle of the orbit. A murmur could be perceived isochronous with the cardiac systole. Compression of the left carotid performed by the patient himself with the assistance of a suitable compress, caused the exophthalmus to disappear in three weeks.

LUBRECHT (366) saw an exophthalmus develop in the right eye of a man, aged forty-nine, after a severe fall upon the head. Pulsation synchronous with the cardiac systole was noticed. No murmur could be heard by auscultation. The exophthalmus disappeared after ligation of the common carotid.

EALES (365) observed double optic neuritis and fluctuating swelling above and to one side of the right eye after a violent blow upon the right temple. The spot was incised, and a piece of bone as large as a quarter of a dollar, and belonging to the external angle of the superior orbital roof, was removed. A fistula soon formed in the neighboring bone, and the neuritis gradually but surely retrograded.

HARDY (367) describes a case of Basedow's disease which distinguished itself from the average by its rapid course. (Death after six months.)

## VI—CONJUNCTIVA, CORNEA, SCLEROTICA, ANTERIOR CHAMBER.

368. HAUSSMANN. On the origin of conjunctival affections in the newly-born. *Arch. f. Gynækol.*, Band xxi., 3, p. 523.

369. Escolais. Traitement de l'ophthalmie des nouveau-nés par l'acide phénique. *Thèse de Paris*, 1883.

370. Carré. Encore quelques notes sur le traitement de la conjonçtivite purulente à propos d'une communication de M. Fieuzal au Congrès de Genève. *Gaz. d' ophthal.*, 1883, No. 10.

371. Schaffer. On the treatment of contagious forms of conjunctival affections. Vienna, 1883.

372. Walker. Peroxide of hydrogen in cases of blennorrhœa *Medical Record*, Aug. 25, 1883.

373. Bono. Rare cases of the transmission of blennorrhagia to the eyes. *Gaz. delle Cliniche*, vol. xix., p. 14.

374. Minkiewitsch. On contagious or epidemic conjunctivitis. *Wojeno Med. Jour.*, 1883, May.

375. Simi. On purulent ophthalmia. *Annali di Ottal.*, vol. xii., 1.

376. Abadie. Nature et traitement de l'ophthalmie purulente. *Gaz. des hôpitaux*, 1883, 644.

377. Panas. Conjonctivite rheumatismale. *Acad. de Méd.*, May 1, 1883.

378. Perrin. Conjonctivite purulente. *Bull. de l'Acad. de Méd.*, Nos. 16–19, 1883.

379. Robert. Conjonctivites catarrhales avec arthrites consécutives. *Rec. a'ophth.*, No. 7, 1883, 311.

380. Sédan. Un dernier mot au sujet de l'emploi de l'iodure d'argent naissant en oculistique. *Rec. d'ophthal.*, 1883, No. 5, p. 264.

381. Sédan. De la thérapeutique des affections externes du globe oculaire sur les yeux nitratés. *Rev. clin. d'ocul.*, 1883, p. 250,

382. Potu. Contributions à l'étude de conjonctivite diphthéritique. *Thèse de Paris*, 1883.

383. Goldoni. A case of diphtheritis of the conjunctiva and tonsils, together with facial erysipelas, promptly cured by salicylic acid. *Gaz. d' ospit.*, anno iv., No. 33.

384. Talko. The caustic action of calomel upon the conjunctiva. Hemorrhages from the conjunctiva. *Medicun*, part xi., 1883.

385. Goldscheider. Caustic action of insufflated calomel upon the conjunctiva. *Berlin. klin. Wochenschr.*, 1883, No. 42.

386. JACOBSON. How should the army physician, as recruiting officer, act in cases of the so-called contagious diseases of the eye? *Berlin. klin. Wochen.*, 1883, No. 22.

387. PASSAUER. Explanation of the doctrine of the contagious inflammations of the eye. *Berlin. klin. Wochsenschr.*, 1883, No. 28.

Credé has expressed the opinion that a pure catarrhal secretion of the genitals does not produce blennorrhœa, but HAUSSMANN (368) opposes this view, and argues additionally that every pathological vaginal secretion is capable of being infectious.

ESCOLAIS (369) resorts to irrigations of carbolic acid (1:300) or boric acid (1:20) in blennorrhœa neonatorum, instead of caustics.

MARCKWORT.

CARRÉ (370) replies to Fieuzal, who advises disinfectants only in the treatment of purulent conjunctivitis, that caustics are indispensable. MARCKWORT.

SCHAFFER (371) rejects the various methods of cauterization in the infectious forms of conjunctivitis, and supplies their place by the internal use of potassic iodide and sodic iodide. He uses at the same time, externally, the yellow precipitate ointment and zinc sulphate.

WALKER (372) had excellent results with the peroxide of hydrogen.

BONO (373) reports three cases of blennorrhœa of the conjunctiva in adults who had been infected by a third person. The first case was that of a young lady who kissed and embraced, after a long absence, a brother who was suffering from blennorrhœa of the urethra; the second was that of a boy who slept in the bed of a patient suffering from gonorrhœa; whilst the third was that of a workman from whose eye a friend, affected with gonorrhœa, removed a foreign body. DANTONE.

MINKIEWITSCH (374) found that contagious conjunctivitis was most infectious in the beginning of the disease. He recommends us to resort in this disease to the instillation of a two-per-cent. solution of silver nitrate into the conjunctival sac and then to dilute it with water. In corneal complications, however, this solution is dangerous. HIRSCHMANN.

SIMI (375) has tried every one of the antiseptics recommended of late years for suppurative inflammation of the conjunctival sac, and speaks very favorably of resorcin, because it not only acts

antiseptically, but has the least chemical action upon the tissues of the eye. Nevertheless the results which he has had with antiseptics of all kinds are not one whit better than those obtained with the old classical treatment of silver nitrate. DANTONE.

ABADIE (376) denies the existence of such a disease as rheumatic purulent conjunctivitis. The diagnostic difference between a catarrhal conjunctivitis and a genuine purulent conjunctivitis is the constant appearance of a micrococcus in the latter disease.
MARCKWORT.

PANAS (377) believes that cases of rheumatic conjunctivitis, such as Perrin describes, are to be accepted with a great deal of reserve. For himself, he has never seen any such cases. The purely rheumatic forms are very benignant; in malignant forms we ought to be able to exclude blennorrhœa and granulations.

PERRIN (378) answers Panas by reading the history of a case, carefully observed by De Belval, of purulent rheumatic conjunctivitis in a young man without any granulations.
MITTLESTÄDT.

ROBERT (379) describes six cases which he had observed within thirty-three days, in which an acute conjunctivitis was followed by an affection of the joints which bore great resemblance to arthritis blennorrhagica. This particular type of disease is developed, during very damp weather, in persons that are predisposed to arthritis by reason of their lymphatic diathesis and hereditary influences. MARCKWORT.

SÉDAN (380) recommends nascent silver iodide in purulent and catarrhal conjunctivitis, as well as in all corneal ulcers.
MARCKWORT.

The slightest conjunctivitis, blepharitis, and keratitis are very difficult to cure in those eyes which have been treated too long with silver nitrate. SÉDAN (381) observed one hundred cases of this nature in a period of ten years passed in Algiers.
MARCKWORT.

Diphtheritic conjunctivitis according to POTU (382) is simply the ocular expression of a constitutional affection. A conjunctiva affected with catarrh or blennorrhœa offers only a place of less resistance upon which the general constitutional affection can spread itself. Pain is generally absent in diphtheritic conjunctivitis; if it should, however, be present, it indicates that the globe itself is also affected. The treatment consists in local cold and the exhibition of tonics. MARCKWORT.

GOLDONI (383) treated a case of diphtheritis in a man æt. thirty-two years, with large doses of salicylic acid and local cleanliness alone. The disease which developed itself in the eye, and then affected the throat, and to which facial erysipelas associated itself on the third day, reached its acme on the sixth day, and had wholly disappeared on the eleventh, without leaving any trace whatsoever upon the cornea. DANTONE.

TALKO (384) and GOLDSCHEIDER (385) report several cases of caustic action after insufflating calomel into the conjunctiva. Goldscheider cannot offer any explanation for so rare a result. But he suspects that calomel in connection with the sodium chloride in the lachrymal secretion may exert a caustic action.

JACOBSON (386) makes the following suggestions concerning recruitment in cases of contagious diseases of the eye. Recruiting should be prohibited in: 1st, acute blennorrhœa, diphtheritic, and croupous conjunctivitis; 2d, chronic blennorrhœa; 3d, severe chronic catarrh with swelling of the conjunctival folds and increased secretion; 4th, all cases of follicular conjunctivitis that have lasted for a long time or have reached a high degree; and 5th, granular conjunctivitis. Recruiting may be allowed in: 1st, acute and chronic catarrh, with a moderate amount of secretion, 2d, so-called primary granulations; 3d, oblong, oval, frogs-spawn-like, pale, follicular hypertrophies on the inferior fold; 4th, short, pedunculated prominences on the external commissure; and 5th, the slighter forms of follicular conjunctivitis with a normal conjunctival fold.

PASSAUER (387) opposes such a classification, especially those which differentiate between granulations and follicular catarrh, because it is frequently impossible to draw any dividing line between them.

388. MANDELSTAMM. The trachomatous process. *V. Graefe's Arch.*, Band xxix., 1., p., 150.

389. GERMANN. Statistical and clinical investigations on trachoma. *Inaug. Dissert.*, Dorpat, 1883.

390. RAEHLMANN. Pathologico-anatomical investigations on the follicular inflammation of the conjunctiva of the eye, or trachoma. *V. Graefe's Archiv.*, Band xxix., 2, pag. 73.

391. PARIZOTTI. Les granulations de la conjonctive et leur traitement. *Rec. d'oph.*, tom. iii., No. 6, p. 321.

392. SATTLER. The jequirity-ophthalmia, a new infectious

disease. *Wiener med. Wochensch.*, 1883, Nos. 17-21. *Klin. Mon. f. A.* Band xxi., pag. 207 ; *Annal. d'ocul.*, tom. xc., pag. 29.

393. DENEFFE. L'ophthalmie granuleuse et le jequirity. *Rec. d'ophth.*, tom. iv., part 5, pag. 245.

394. WECKER. On the clinical use of the jequirity-ophthalmia. *Kl. Mon. f. A.* Band xxi., p. 259 ; *Annal. d'ocul.*, tom. lxxxix., p. 217 ; *Annali di Ottal.*, vol. xii., p. 240.

395. FERRI. Jequirity. *Boll. d'Ocul.*, vol. v., June, 1883.

396. MANFREDI. The jequirity-conjunctivitis and its efficacy in the cure of trachoma. *Mem d. R. Acad., etc., di Modena*, vol. ii., part 2, 1883 ; *Boll. d'Ocul.*, vol. v., p. 297 ; *Annal. d'ocul.*, tom. xc., p. 80.

397. PESCHEL. Cases of granular conjunctivitis cured by jequirity. *Gaz. degli Ospidali*, 1883, Maggio 13th.

398. BRAILEY. Jequirity. *Brit. Med. Jour.*, 1883, No. 1168.

398*a*. DUJARDIN. Jequirity. Lille, 1883, Juin.

399. BERNARD. Treatment of trachoma with jequirity and cantharidin. Tolouse, 1883.

399*a*. BORDET. Jequirity. Lyon, 1883.

400. PECK. Jequirity in pannus. *N. Y. Med. Record*, July 14, 1883.

401. BUSINELLI. Cure of corneal pannus by the infusion of jequirity. *Boll. d'Ocul.*, vol. iv., part 1, p. 6.

402. PARIZOTTI and GALEZOWSKI. Du jequirity et de son insucces dans le traitement des granulations. *Rec. a'oph.*, tom. iv., 8, p. 454.

403. CARRÉ. Le jequirity. *Gaz. d'oph.*, 1883, No. 11.

403*a*. DE MAGRI and DENTI. Jequirity. *Gazz. d'Ospit.*, iv., 42.

404. ADAMÜCK. On the conjunctivitis produced by jequirity. *Journal des ärztl. Vereins zu Kasan*, 1883, No. 9.

405. KASAUROW. Trachoma. *Wratsch*, 1883.

MANDELSTAMM (388) first called attention to the evident lack of unity in the generally accepted opinions concerning trachoma, and then mentioned Sattler's discovery of the trachoma micrococcus. He finally gives us a synopsis of twenty-two typical cases of trachoma, from all of which microscopic preparations were taken at various stages. The same pathological structures in a more or less advanced degree of development were discovered

in all forms of trachoma, and of the so-called granular as well as of the follicular catarrh. The adenoid mucous tissue particularly is more or less extensively infiltrated with white blood-corpuscles, the so-called lymph-cells which evidently originate in the lymphatics and blood-vessels and then collect about the latter. In addition to these we invariably find follicles or granulations or trachoma granules. The three latter consist of a collection of lymph-cells of round or oval shape, but no decided stroma can anywhere be discovered. The designation follicle is unfortunate, since there is only an external resemblance between them and the lymph-follicles. Follicles are to be regarded as the cardinal symptom of trachoma. But to them nothing specific can be attributed. They probably arise from congestion in the blood and lymphatic system; possibly also from the enlargement of pre-formed lymph-spaces in the conjunctiva. The second pathological substratum which we meet in all forms of trachoma are the proliferated papillæ, the granulations, which show most curiously varying shapes. Sometimes they cover the mucous membrane like sharp-pointed red papules, or again they appear as red flattened warts or button-shaped growths with broad domes, while finally they are occasionally found in the shape of a cock's-comb. Trachoma is a collective idea for one and the same inflammation of the conjunctiva. All forms of trachoma are stages of one and the same disease. The various structures are products of inflammation which either retrograde or develop into higher organizations. The specific nature of trachoma is negatived: (1) by the fact that there are no specific structures which stamp the disease as a trachoma—the so-called trachoma-granules are simple clusters of lymph-cells; (2) that acute follicular catarrh cannot either clinically or histologically be distinguished from trachoma; (3) that the presence of micrococci in trachomatous mucous membranes, rather denies than favors the specific nature of the trachoma, for the very reason that the same micrococcus is also found in blennorrhœa; and (4) that it is impossible in an inflamed mucous membrane, in which follicles exclusively are visible, to decide in what direction the morbid process will develop itself. The best thing for us to do is to assume that there are two chief forms of trachoma: a follicular or granular, and a papillary or epithelial. In the first class we include the follicular conjunctivitis of Saemisch, the ophthalmia granulosa of Arlt, and the trachomatous infiltration; in the second, the chronic trachoma of Saemisch,

or the papillary trachoma of other authors. The former generally permits us to prognosticate a perfect recovery, the latter has, probably from the first, caused deep-seated alterations in the structure affected. Forms which lie between the two are frequently observed.[1]

GERMANN (389) subdivides the trachomatous morbid process into three different stages: (1) the stage of deposition of granules or the formation of follicles; (2) that of trachomatous degeneration or ulceration; (3) the cicatrical stage.

The nature and foundation of the trachomatous process is to be sought for, according to RAEHLMANN (390), in the formation of the follicles which are never seen in the normal conjunctiva. In the preliminary stage the adenoid layer of this membrane is interspersed with lymph-corpuscles. After a short period separate clusters push above the surrounding level and appear as if sharply defined by the manner in which the cells are grouped together. Within these young follicles we recognize, after an interval of short duration, a distinct superstructure, which is composed of fibrous tissue. The lymph-cells which appertain to the centre of the follicles now appear rounder and larger, and lie scattered about in the wider meshes of a pale network, while the peripheral lymph-corpuscles lying in the narrower and closer meshes are found to be smaller. The latter are gradually pulled out into fibres, and it is these which form the dark fibrous limiting membrane of the follicle. The contents of the follicles may degenerate by softening, or by induration. The pathological alterations which trachoma causes in the conjunctiva, depend upon the situation, size, and number of the follicles. Round about these we see groups of lymph-cells arranged like nests. In this way we may obtain a solid, diffuse infiltration of the whole surface of the conjunctiva, from which the clusters of follicles project in the form of semilunar prominences. The anterior wall of the follicle frequently wears away, and the follicle then drops outward, after which we may observe exfoliation of the epithelial membrane and of the conjunctiva, from which result a few, or even numerous, follicular ulcerations upon its outer surface. In this way also the mucous membrane may be destroyed over a large extent of surface, and so become transformed into fibrous connective tissue. The conjunctiva as a matter of course then loses its property as a secretory membrane.

[1] The same views and general subdivision of trachoma were expressed in Stellwag's text-book many years ago.—H. K.

It follows from all this that trachoma can be defined as a follicular, ulcerative inflammation, which destroys the adenoid tissue of the conjunctiva. The trachomatous disease may confine itself to various districts of this membrane, while on the other hand the process, although coming to a pause at this or that locality, may proliferate still further and further in the region of the cicatrix, and finally spread over the entire mucous membrane. The tubular glands observed in trachoma by Berlin and Iwanoff, which have only an accidental and never a specific importance, owe their origin to total or partial closure of Stieda's dehiscences, the walls of which are ulcerating, and thus enclose peculiar gland-like formations. The goblet-cells which are found in these same structures are the result of mucous degeneration of the epithelium. Many authors classify trachoma with other chronic inflammations of the conjunctiva, especially with blennorrhœa. But in trachoma the follicles offer their characteristic condition, while in the latter, in the chronic stage, we especially observe papilla-like proliferations. In the latter case the alterations are found in the subepithelial layer, while those of trachoma extend more deeply into the tissues beneath. Blennorrhœa, as well as trachoma, may, like other diseases of the conjunctiva, follow one another upon the same mucous membrane, yet cases of such a sequence are rare. Follicular catarrh cannot be distinguished from trachoma; there is absolutely no quantitative or qualitative difference between the two. In the incipient stage of cicatrization of trachoma, a thick layer of fresh connective tissue lies upon the inner surface of the cartilage, and then at a later period is subjected to sclerosis and cicatricial contraction. This process necessarily produces contraction of the cartilage of the lid.

Parizotti (391) gives a general description of granular conjunctivitis and its treatment, and in conclusion recommends excision of the conjunctival fold as a cure for this affection.

Sattler (392) examined the ophthalmia produced in man and rabbits by the jequirity seeds, and found that it differed in remarkable and essential points from any other artificial inflammation. The ophthalmia bears the greatest possible resemblance to an acute infectious disease, and approaches in many respects acute conjunctival blennorrhœa, particularly those severe types in which the conjunctiva is grayish and exhibits a surface covered with a coagulable exudation. Sattler succeeded in finding typical micro-organisms in the macerated fluid prepared from the beans,

as well as in the diseased tissue and the products which it furnished. He also succeeded in proving that the macerated fluid lost its activity the moment that it was deprived of its characteristic micro-organisms. The latter could be propagated by cultivation through several generations, and even the latest generations always produced an ophthalmia when placed within or upon the conjunctival sac. The microbes are cylindrical, rounded-off at the ends, slightly opaque rods, of about the same thickness throughout, and yet varying much in length. They are found partly single, partly in pairs, and rarer in chains of three or four. Some of them are free from motion, some again swing and rotate and twist about, while a few move rapidly from place to place. At a later stage spore-like elements appear amidst the bacilli, and are sooner noticed with a temperature of 34°–36° C. (93°–97 F.) than when the temperature is lower. They are exquisite aërobian elements. According to Sattler, the jequirity-ophthalmia produces so violent a reactive inflammation by its micro-parasitic properties in the region upon which the trachomatous process has set its foot, that the entire district is so specifically altered in structure that the micro-organisms which produce trachoma can no longer flourish, and with their annihilation the trachoma itself disappears.

Deneffe (393) made repeated experiments with the jequirity-maceration as directed by Wecker, but denies that it has any therapeutical action in trachoma.

Manfredi (396) discovered that every infusion of jequirity lost its property when heated to 90° C. (194° F.). The water in which the hulled beans are boiled for twenty minutes produces no effect, while the beans produce, though in a less degree, the same effect if placed in a finely pulverized state upon the conjunctiva, as that produced by fresh beans in an infusion. All power of producing inflammation disappears after boiling the *pulverized* beans for twenty minutes. The beans remain unaltered when treated with ether and the ether itself has no action upon the conjunctiva. The author could not succeed in inoculating the jequirity-inflammation from one eye to the other. He was quite satisfied with the curative action of jequirity-infusion in trachoma. Of 69 eyes thus treated, 18 (26 per cent.) were perfectly relieved, 28 were not further treated, 20 remained unaltered, **three were destroyed by ulceration of the cornea.** The latter happened once after using the powder in substance; the other eyes were in the case of a patient to whom the infusion had been given for

washing the eyes at home. Manfredi uses only a solution of one and a half per cent. DANTONE.

The jequirity-ophthalmia is absolutely different from acute blennorrhœa DUJARDIN (398*a*), and does not destroy granulations like the latter. At the most it clears up the associated pannus. Caustics cannot be dispensed with.

The jequirity-inflammation, according to BORDET (399 *a*), always appears after correctly using an infusion of the bean, but it does not cure the granulations. MARCKWORT.

PARIZOTTI and GALEZOWSKY (402) used jequirity in three cases of granular conjunctivitis and arrived at the conclusion that the suppuration produced by jequirity does not remove the granulations; they are only concealed by the swollen condition of the conjunctiva, and return to view when the swelling subsides. The infusion may increase any pre-existing corneal affection.

DE MAGNI and DENTI (403*a*) are also dissatisfied with the results of the jequirity treatment. In five cases of old trachoma with pannus the desired inflammation did indeed appear, yet only once was any false membrane found. The action upon the granulous cornea was negative, while in *one case* the cornea was left extremely opaque. DANTONE.

KAZAUROW (405) prefers the copper crayon in fresh cases of trachoma, with simultaneous use of iodoform ointment and solution of silver nitrate (in cases of excessive secretion). In more obstinate cases with well-developed granulations (but not papillæ) he shaves off the granulations with a sharp spoon.

DE WECKER (394) endeavors to prove the correctness of his previous assertions concerning jequirity, as against Deneffe, Lainati, and Niccolini.

FERRI (395) reports from Paris that De Wecker at present uses twenty-four hours' infusion of the hulled and pulverized jequirity beans in *cold* water only, and that it is filtered but *once*. Six grammes of jequirity powder to three hundred grammes of water are used for a weak infusion, nine grammes for a medium, and fifteen grammes for a strong infusion. DANTONE.

PESCHEL (397) has seen granulations improve and the cornea clear up in those patients whom he has treated with jequirity, yet he is obliged to acknowledge that *corneal ulcers* were frequently observed. The author thinks that although the remedy is not infallible, yet it has a great future before it in ophthalmological surgery. DANTONE.

Brailey (398) recommends jequirity, although in the average run of cases it does not destroy the granulations. Nevertheless it affords decided diminution of pain and photophobia, and often clears up the cornea in a marvellous fashion. Nor does it ever do any harm to the neighboring tissues, and in this respect it is decidedly to be preferred to any other means of inoculation of blennorrhœa.

Peck (400) reports seventeen cases of inveterate pannus in which the use of jequirity was followed by favorable results in removing granulations of the cornea and conjunctiva. Thick white corneal opacities were unaffected by the treatment.

Burnett.

Bernard (399) believes that the granulations accompanying pannus can be cured by jequirity. Cantharidin acts much in the same way as jequirity.

Businelli (401) has obtained favorable results after using jequirity. In five cases out of six the cornea cleared up nicely.

Adamück (404) was only able to obtain results as brilliant as those reported by De Wecker, after using an infusion twice or three times as strong. The suppuration was on the whole rather slight, but persisted for a fortnight or more. The pannus subsequently disappeared more or less completely, but the trachomatous process remained precisely as before. The action of the drug was not always favorable in cases of corneal ulcers. Adamuck is inclined to attribute the inflammatory action of the infusion to the numerous micro-organisms which, according to Prof. Sowkin also, it undoubtedly contains. Dr. Nawalichin is reported to have discovered in jequirity an especial acid in crystalline form, a solution of which, as he has asserted, exerts a remarkably energetic inflammatory action upon the conjunctiva. On the contrary, Adamück's experiments with this basic acid *gave negative results.*

406. Selitzky. Iodoform in trachoma. *Med. Wjestnick*, 1883, Nos. 17 and 18.

407. Pereyra. On some therapeutic uses of iodoform. *Le Sperimentale*, anno xxxvii., fasc. 3.

408. Saltini. Iodoform in ocular therapeutics. *Gazz. d. Ospit.*, anno iv., Nos. 48, 49, and 51.

409. Deutschmann. Further experiences with iodoform. *V. Graefe's Archiv*, Band xxix, 1, p. 318.

410. Vossius. On the use of iodoform in ophthalmic practice. *V. Graefe's Archiv*, band xxix, 1, p. 297.

411. ALKER. On the therapeutical value of iodoform. *Inaug. Dissert.*, Giessen, 1883.

412. GALEZOWSKY. Iodoform dans les ulcères rongeants de la cornée. *Rec. d' ophth.*, 1883, p. 348.

SELITZKY (406) recommends the use of iodoforn in ointment form in trachoma; he also uses other remedies at the same time. Under this treatment he has seen trachoma entirely disappear.

HIRSCHMANN.

PEREYRA (407) has employed iodoform, pulverized and in ointment (1 to 8), in more than 100 cases. Its action is not satisfactory in conjunctival affections; it has no influence upon pannus, but in ulcers of the cornea it is of the greatest value. The author asserts that iodoform also possesses a myotic action and diminishes intra-ocular pressure without, however, affecting the accommodation. Two cases of chronic glaucoma with inflammatory relapses were cured by the iodoform treatment, *i. e.*, the pain decreased and the eye became more quiet. DANTONE.

SALTINI (408) also used iodoform in phlyctenular conjunctivitis, blennorrhœa neonat., in trachoma, pannus, etc., but did not obtain any remarkable results. This remedy is most valuable in corneal ulcers. Although Saltini was enabled to achieve unexpectedly brilliant results in four severe cases of hypopyon-keratitis, he does not regard iodoform as the sovereign remedy in this form of disease, and believes that he could have obtained the same results by other methods of treatment. Iodoform has no value in parenchymatous keratitis. DANTONE.

The use of iodoform in blennorrhœa and trachoma is not advisable, says DEUTSCHMANN (409), because it occasionally irritates the conjunctiva exceedingly. It is, however, to be recommended after all operations on the eye and in cases of hypopyon-keratitis. Extraordinarily good results were obtained by blowing the pulverized iodoform into the lachrymal passages in blennorrhœa of the lachrymal sac.

VOSSIUS (410) recommends iodoform in all ulcerative processes of the cornea, especially in *ulcus serpens;* also in all superficial and deep injuries of the conjunctiva and cornea: finally as an antiseptic in wounds of the sclerotic.

According to ALKER (411) iodoform is well borne by a majority of patients. It is of especial benefit in all ulcerative processes of the cornea, particularly in the infectious forms of hypopyon-

keratitis, although there are cases in which neither iodoform nor Saemisch's operation can prevent total suppuration of the cornea. Iodoform is of great value, not only as an antiseptic, but also as an aseptic in all fresh injuries. It frequently clears up the cornea in the most brilliant manner in scrofulous pannus and deeper-lying corneal infiltrations.

GALEZOWSKY (412) advises the use of iodoform ointment in the treatment of most ulcers of the cornea. At the same time, however, the usual remedies are to be employed—atropia, eserine, etc. Several cases are described. MARCKWORT.

413. PFEIFFER. Tubercle bacilli in lupus of the conjunctiva. *Berlin. klin. Wochensch.*, 1883, No. 28.

414. MAKROCKI. Three cases of cysticercus under the subconjunctiva, with remarks on the histological structure of the capsule. *K. M. f. A.*, Band xxi, p. 329.

415. HORROCKS. Facial, conjunctival, and retinal nævus. *Lancet*, 1883, vol. ii., No. 3.

416. VINALES. Operation for pterygium, by Dr. CREUS. *Eco de la Clinica*, 1883.

417. GOUVEA contributes to our knowledge of hemeralopia and xerophthalmia due to disturbances of nutrition. *V. Graefe's Archiv*, Band xxix., i., p. 167.

418. LEBER. On xerosis of the conjunctiva and infantile ulceration of the cornea, with remarks on the origin of xerosis. *V. Graefe's Archiv*, Band xxix., i., p. 328, and ii., p. 225.

MAKROCKI describes (414) three cases of extraction of a cysticercus from the subconjunctival tissue in children. The capsule of the cysticercus was found to consist of a frame-work of connective tissue composed of thick fibres of connective tissue, running lengthwise, and crossed by elastic fibres. The outer and inner surfaces were partially covered with a capillary mesh-work, which was rich in anastomoses. The external surface showed considerable endosmosis and exosmosis of white blood-corpuscles, which, toward the inner surface, had been transformed into epithelial cells.

CREUS (416) operates upon pterygium by loosening the vertex as far as 3 *mm.* beyond the margin of the cornea, then turns the vertex over to form a duplicature in such a way that the two bleeding surfaces touch. So soon as they are accurately adjusted, sutures are applied.

GOUVEA'S observations (417) show that xerophthalmia is always dependent upon disturbances of nutrition. Hemeralopia invariably precedes every xerotic alteration of the conjunctiva, accompanies this eye-disease, and in the most advanced stages is transformed into genuine amblopia. Hemeralopia, again, always depends upon a more or less advanced anæmia of the retina, which, in turn, is a sequence of mal-nutrition. The first signs of xerophthalmia appear simultaneously with the diminution of sensibility. The conjunctiva, which, since the beginning of the hemeralopia, had been pallid from lack of blood, assumes a darker tinge at the corneal margin, loses its brilliancy and smoothness, foam-like masses appear in the region of the palpebral fissure, the mucous membrane becomes more and more dry, and at last exhibits a skin-like appearance. In this condition the sensibility of the cornea decreases, and there now ensues a subconjunctival and pericorneal injection, which is accompanied with tears and followed by a diffuse opacity, which slowly grows and gradually advances over the entire cornea. Pale-red flattened follicles next start upon the conjunctiva of the lower lid, especially near the fornix of the conjunctiva; the foam-like substance increases in bulk by forming genuine plates on both sides of the cornea, and even rising above the margin of the latter. In the cornea itself an inflammatory infiltration is formed, associated with photophobia, lachrymation and secretion of a cream-like mucus, which contains a few pus-corpuscles and the same elements as the foam-like substance which is located in the fissure of the lid, particularly pavement-epithelium and a large number of free fatty cells. The inflammation rapidly increases, and in a few hours the cornea is totally lost.

LEBER (418) examined after death a case of infantile xerosis with corneal suppuration. The cellular plates of the desquamated conjunctival epithelium were abundantly covered and often fully hidden by peculiar, partly rod-like, partly coccus-like, schizomycetes. These were also found in the covering of the corneal ulcer and in the interior of the globe, which had been entirely destroyed by suppuration. The introduction of a large amount of cultivated mould into the conjunctival sac of rabbits produced ulcerative keratitis, which progressed for a few days, but then healed.

In the case under discussion, defective nutrition could not possibly have caused the disease, because the child only began to fail after the affection of the eye had already made marked progress.

Death was due to broncho-pneumonia. The brain was found perfectly normal, but the pelvis of the kidneys showed a desquamative epithelial affection which coincided perfectly with the xerosis of the conjunctiva, and contained the very same sort of schizomycetes. The conclusion is therefore reached that xerosis of the conjunctiva and cornea does not depend upon an affection of the brain, as has previously been assumed, but that it is an affection of a parasitic nature. In *secondary xerosis* (so-called) a transitory inflammatory process produced some epithelial alteration which prepares the substratum for a local mycosis, which again in turn is followed by a still more extensive desquamative affection of the epithelium. Xerophthalmus is, on the whole, to be regarded as a dryness of the ocular surface, which depends primarily upon desiccation of the secretion of the conjunctiva and lachrymal glands, and secondarily upon defective protection by the eyelids, whereby finally a more or less pronounced secondary xerosis is developed.

419. Uhthoff. Partial necrosis of the human cornea by the immigration of mould. *V. Graefe's Archiv*, Band xxiv., 2, p. 178.

420. Couzon. Contribution à l'étude de la kératite interstitielle dans la syphilis héréditaire et dans la syphilis acquise. *Thèse de Paris*, 1883.

421. Martin. Sur le rapport, qui existe entre une variété de la kératite grave, dite scrofuleuse, et l'astigmatisme de la cornée. *Annal. d'oculistique*, tom. xc., p. 14.

422. Quaglino. On the surgical treatment of partial opaque staphyloma of the cornea. *Annal. di Ottal.*, vol. xii., 1, p. 3.

423. Masselon. On the use of Wecker's purse-suture in the removal of staphyloma and enucleation. *K. Mon. f. A.*, Band xxi., p. 359 ; *Annal. d'oculist.*, tom. xc., p. 23.

424. Frank. Case of partial keratoconus, with a remarkable change in the refraction, following an injury. *Maryland Med. Jour.*, Sept., 1883.

425. Angelucci. Ophthalmometric investigations to determine irregular astigmatism in conical cornea. *Annal. di Ottal.*, vol. vii., 1.

426. Raehlmann. On the use of hyperbolic glasses for the correction of keratoconus and irregular astigmatism. *Report of the Eye Clinic at Dorpat*, Dorpat, 1883.

Couzon (420) asserts that interstitial keratitis is a freqent re-

sult of congenital syphilis, while occasionally it is seen in acquired cases of this disease. Rheumatism may also excite attacks of interstitial keratitis. MARCKWORT.

MARTIN (421) brings forward a new form of keratitis which he calls astigmatic keratitis. We frequently see in scrofulous persons, between the age of six and twenty, an extremely obstinate keratitis, which is due, as Martin insists, to a corneal astigmatism. Any corneal astigmatism is corrected by varying degrees of accommodative energy in the two main axes, but this very energy, according to Martin, produces the corneal inflammation. Astigmatism, therefore, is the cause of the corneal affection, and the author endeavors to prove the fact. In order to cure the keratitis the accommodation in both eyes must be paralyzed. Relapses can be prevented by furnishing proper correcting glasses, while in the very same way the appearance of astigmatic keratitis can be prevented. MARCKWORT.

QUAGLINO (422) has succeeded in many cases of partial staphyloma of the cornea in obtaining smooth cicatrices and a cessation of the irritative symptoms by resorting to iridectomy and removing the projecting cicatricial tissue. Flarer recommended iridectomy long before v. Graefe, but it fell into oblivion till the latter brought it once more before the profession. DANTONE.

De WECKER (423) in removing a corneal staphyloma dissects the conjunctiva somewhat backward from around the cornea, passes a suture in and out over and over again through the conjunctiva and entirely around the cornea. He then removes the staphyloma. Directly afterward the conjunctiva is drawn up by the thread precisely like a tobacco-pouch. De Wecker also uses a similar suture in the conjunctiva after enucleation, and ties it tightly. He thinks that this procedure procures a more rapid cure. WARLOMNT remarks that this method was proposed years ago by Critchett or Bowman, but was abandoned because it occasionally caused a collection of pus, which in more than one case had endangered life.

FRANK (424) reports the following case: The patient ran against a ladder. The globe was ruptured at the sclero-corneal margin and a hernia of the iris ensued. This was removed close to the globe with scissors. The refraction of the eye then began to alter, and finally S became $\frac{10}{10}$ with $+\frac{1}{4}$ sph $\supset +\frac{1}{4}$ cyl axis 56°. The author would thus argue in favor of iridectomy as a remedial measure in keratoconus. BURNETT.

ANGELUCCI (425) has made many ophthalmometric measurements of the healthy cornea, and has discovered in addition to the constant flattening at the perphery, variations of curvature in one and the same meridian, and not only in comparison of the middle portion with the centre, but with one another.

DANTONE.

RAEHLMANN (426) recommends the use of hyperbolic glasses in typical keratoconus and in irregular astigmatism.

427. HIRSCHBERG. On congenital pigmentation of the sclera and its pathogenetic significance. *V. Graefe's Archiv*, Band xxix., 1, p. 3.

428. UHTHOFF. Scleritis and episcleritis. Vernal conjunctivitis. *V. Graefe's Archiv*, Band xxix., 1, p. 167; these ARCHIVES, vol. xii., p. 275.

429. HIGGENS. Gummata of the sclerotic. *Brit. Med. Jour.*, Feb., 1883, p. 247.

430. HIRSCHBERG and BIRNBACHER. Contributions to the pathology of the eye. Congenital lipomatous dermoid in and behind the equatorial region of the eyeball. *C. f. A.*, 1883, Band vii., p. 295.

HIRSCHBERG (427) publishes three cases of melanosis of the sclera, in two of which the eye had to be removed on account of an intra-ocular tumor. In his opinion melanosis of the sclera indicates a certain predisposition to subsequent development of a tumor in the eye, just in the same way as congenital pigmentation of the skin may, in old age, form the starting-point of melanotic growths.

HIGGENS (429) reports three cases of gummata of the sclera. The first one recovered after a treatment of several months duration. In the second, the tumor covered both the inner and outer surface of the sclera, and had caused detachment of the retina. The third resisted treatment for a long time. FITZGERALD.

HIRSCHBERG (430) removed from the lateral portion of the sclera a tumor 18 *mm.* long, 10 *mm.* broad, and 7 *mm.* thick, which proved to be a dermoid tumor with fatty tissues in the deeper layers.

## C.—IRIS, CHOROID, GLAUCOMA, SYMPATHETIC OPHTHALMIA, LENS, VITREOUS, RETINA (FUNCTIONAL DISTURBANCES), OPTIC NERVE, INJURIES (FOREIGN BODIES) AND PARASITES, OCULAR AFFECTIONS IN GENERAL CONSTITUTIONAL DISEASES.

By Dr. A. NIEDEN.

### I.—IRIS.

431. Danesi. Coloboma of the iris. *Boll. d' Ocul.*, vol. v., 9, March, 1883.

Danesi (431) describes a congenital coloboma of the iris in which the corresponding portion of the ciliary processes was also absent. The choroid was intact, but numerous deposits of pigment were found in the fundus. M = 1.75 D : S = ½. Dantone.

### II.—CHOROID.

432. Hosch. Chronic tuberculosis of the choroid. *Correspbl. f. Schweiz. Aertzte*, March, 1883.

433. Swanzy. Intraocular tumor. *Brit. Med. Jour.*, Feb'y 10, 1883, p. 257.

434. Vossius. Double rupture of the choroid from a blow with a stone. Restoration of vison. *K. Mon. f. A.*, Band xxi., p. 282.

Hosch (432) enucleated the right eye of a man, aged seventeen, who consulted him for a perforating tumor of the ciliary body and choroid. The patient suffered also from an apparently tuberculous affection of the right knee and carpo-metacarpal joint of the left thumb. The tumor consisted of a purely *tuberculous mass* and started from the posterior portion of the *choroid.* Bacilli could not be discovered.

According to Swanzy (433) the greater portion of an intra-ocular tumor which he observed consisted of *melanotic sarcoma.* Only in one spot where it approached very close to the conjunctiva were any distinct alveoli containing epithelial cells visible. But by this very characteristic the tumor exhibited the structure of a carcinomatous sarcoma (Virchow). Fitzgerald.

### III.—GLAUCOMA.

435. Abadie. De l'élongation et de l'arrachement du nerf nasal. *Ann. d'ocul.*, tom. lxxxix., p. 234.

436. BADAL. Leçons sur le traitement du glaucome par l'élongation (avec arrachement) du nerf nasal externe. *Gaz. hebd. des scienc. méd. de Bordeaux*, 1883, Nos. 13, 16, and 19 ; also *Annales d'oculistique*, tom. lxxxix., p. 231.

437. DIANOUX. De la malaxation de l'œil après la sclérotomie. *Arch. d'ophth.*, tom. iii., 5.

438. TROUSSEAU. De l'élongation du nerf nasal externe dans le traitement du glaucome. *Thèse de Paris*, 1883.

439. WAGNER. Remarks on glaucoma in conclusion of a report upon my own attack of glaucoma. *V. Graefe's Archiv*, Band xxix., 2, p. 280.

WAGNER (439) gives an interesting account of an attack of glaucoma in his own person, which was operated successfully in the first stage. He then narrates his observations on glaucoma and his treatment of the same. Amongst 19,525 eye-patients, 9,622 of whom were Christians and 9,903, Jews, he observed 410 cases of glaucoma—about two per cent. Of the entire number 155 (thirty-eight per cent.) were Christians, and 255 (sixty-two per cent.) were Jews. In other words, amongst the Christian patients one and a half per cent. suffered from glaucoma, amongst the Jewish patients two and a half per cent. According to sex, the Christians showed seventy-eight men and seventy-nine women, while amongst the Jews, 113 men and 142 women were affected. The disease was bilateral in fifty-one and a half per cent., unilateral in forty-eight and a half per cent. The colored halo is not caused by corneal opacity, but by a rapid turbidity of the aqueous. Wagner cannot assent to any so-called prodromal stage. The angle of the iris is suddenly blocked up by a retraction of the iris, which depends upon some unknown nervous influence, and in this way the eye is laid open to the attack. Eserine cannot be regarded as a remedy for the cure of glaucoma ; it can only diminish the force of any given attack. Iridectomy is the best of all operations ever yet proposed for glaucoma, only it ought to be done as early as possible. The optical disturbances to which it gives rise are only noticeable in passing from darkness into the light.

ABADIE (435) is in favor of *stretching the infratrochlear nerve as a cure for glaucoma*, and recommends it, especially, in congenital hydrophthalmia. In a supplement, however, he reports some less favorable results, and expresses the opinion that stretching (always, of course, with rupture) alone is perhaps insufficient to

influence the intra-ocular tension, and that it should be combined with iridectomy or sclerotomy (!—ED.).

BADAL (436) refers to his former paper (these ARCHIVES, xii., 264)[1] on the same subject, and reports that in his clinique iridectomy and sclerotomy have been driven out by stretching of the infratrochlear nerve, with subsequent rupture, which has been successful in fifteen consecutive cases. He urges (*Annales d'oculistique*) ophthalmic surgeons to experiment in this direction.

MARCKWORT.

TROUSSEAU (438) warmly recommends stretching and rupture of the infratrochlear nerve in glaucoma, instead of iridectomy and sclerotomy. He reports nine successful results out of ten attempts. The remaining case was a failure. MARCKWORT.

DIANOUX (437) invariably re-opens the incision made in sclerotomy by gentle pressure with the finger-tips, and continues this for several days. He also urges the patient to do the same for an indefinite length of time in order to obtain a thin filtration-cicatrix or a partial cicatrization of the wound.

### IV.—SYMPATHETIC OPHTHALMIA.

440. ROSMINI. Some very interesting clinical histories of cases of sympathetic ophthalmia. *Annali di Ottalm.*, vol. xii., 1.

ROSMINI (440) rejects every operation on the injured eye except enucleation. Even in glaucomatous degeneration he prefers enucleation to the proposed extraction of the lens, to sclerotomy, and to ciliary neurotomy.

### V.—LENS.

441. ANDREW. Extraction of senile cataract in its capsule. *Brit. Med. Journ.*, Jan. 13, 1883, p. 14.

442. V. ARX. On the pathology of lamellar cataract. *Inaug. Dissert.*, Olten, 1883.

443. BONO. On astigmatism after extraction of cataract. *Giorn. d. R. Acad. di Torino*, fasc. 3, 1883.

444. CANDROU. La maturation artificielle de la cataracte. *Rev. gén. d'ophth.*, 1883, No. 6.

445. EALES. Dislocation of the lens. *Brit. Med. Jour.*, Feb. 24, 1883, p. 363.

446. GRADENIGO. Antisepsis in ophthalmology. *Annali di Ottalm.*, vol. xii., 1.

[1] Where "infra-orbital nerve" should read "infratrochlear nerve."

447. JEAFFRESON. A new operation for cataract. (Nothing new.) *Lancet*, Jan. 27, 1883, p. 167.

448. JULÁSZ. Extraction of cataract. *C. f. A.*, Band vii., p. 232.

449. LEVISTE. De l'opération de la cataracte chez les diabétiques. *Thèse de Paris*, 1883.

450. PURTSCHER. On erythropsia in aphakia. *C. f. A.*, Band vii.. p. 161.

451. SNELL. Cataract extracted by a shallow lower flap. *Brit. Med. Jour.*, Jan. 13, 1883, p. 44.

452. STEFFAN. The peripheral low-flap section, with a report on 300 recent cataract-extractions. *V. Graefe's Archiv*, Band xxix., 2, p. 167.

V. ARX (442) gives a statistical table of the pathology of 189 cases of lamellar cataract observed in Horner's clinique. Fifty-six per cent., 107 cases, suffered from eclamptic attacks in youth; sixty-six per cent., 111 cases, had defective teeth, or else defective development and distribution of the dental enamel; thirty-one per cent., 60 cases, exhibited cranial deformities, caused by irregular ossification of the sutures; twenty-one per cent., 40 cases, had rachitis of the extremities; only 37 cases were entirely free from symptoms of rachitis. We can calculate the age of the cataract by its diameter, for the smaller the nucleus the older the lamellar cataract must be. The development of many of these cases can be referred with great probability to the last months of intrauterine life, but in a majority to a later date. Syphilitic hereditary transmission cannot be regarded as a cause, and since rachitis is not a sequel of syphilis, lamellar cataract can only he looked upon as a sequel of rachitis. If S is $\frac{1}{3}$ or $\frac{1}{4}$ and the opaque nucleus is small, operative interference is not indicated, otherwise discision and eventually an iridectomy for optical purposes are indicated. After the twentieth or twenty-fifth year extraction in the capsule is to be undertaken.

PURTSCHER (450) reports four new observations of red-vision in aphakia. He considers it to be a purely subjective phenomenon, having its foundation in the light-perceiving apparatus, and that it is both directly and indirectly dependent upon nervous influences, such as weariness, congestion, glaring reflection of light, etc. Slight degrees of red-vision occur much more frequently than is generally supposed, but they do not often appear before the oculist for consultation.

BONO (443) found *thirty-nine cases of astigmatism in forty eyes which had been subjected to cataract-extraction with a low-flap section.* The amount varied from 0.75 D to 4 D; AS = 3 D or 3½ D was the most frequent (in seven cases). The examination was made in most of the cases in the early months after the operation; in twelve, however, several month or even years later. The vertical meridian was the one of weakest refraction in twenty-four cases, the horizontal in three cases, while in the remainder the direction was more or less diagonal. DANTONE.

EALES (445) reports three cases of *traumatic dislocation of the lens.* In one case, that of a boy aged four years, the lens remained transparent for five months; in a patient aged fifty-three years, the cataractous lens had been dislocated for thirty years, yet was successfully extracted. FITZGERALD.

CANDROU (444) gives the notes of six cases of successful artificial ripening of cataract by Meyer (after Förster's method), and of their successful extraction. At the conclusion of his paper Candrou suggests that this method can also be employed when we propose to perform extraction without any preliminary iridectomy. In this case it would only be necessary to make a paracentesis of the cornea and let the aqueous escape, when the lens would fall forward upon the cornea. After this the lens could easily be triturated from without. MARCKWORT.

JULÁSZ (448) gives the statistics of 391 cataract-extractions performed according to v. Graefe's method by Prof. Schulek (Buda-Pest): 186 were performed under boric-acid spray, with two and seven tenths per cent. total loss; 205 were performed without the spray, with a loss of only one and three tenths per cent. Soft cataracts, even those which are complicated, are operated upon by discision with subsequent puncture of the cornea.

SNELL'S (451) method bears great resemblance to that of Liebreich's, but the section lies more within the corneal tissue. Iridectomy is rarely made. Out of 120 cases the result was good in 109, in one a secondary operation was necessary; bad result in eight, undecided in one, while one was still under treatment.

STEFFAN (452) contributes the statistics of the results of 300 cataract-extractions, and argues for the peripheral low-flap section. Keyhole-shaped pupil is preferred. The lens is generally removed by simple pressure upon the lids; never is any

instrument employed. Most careful trimming after the operation. The antisepsis consists in careful cleanliness. The results were: 248, = 87 per cent. of operations, without accident; 41, loss of vitreous. Recovery normal in 259 cases, = 86 per cent. Result: 259, = 86 per cent., good; 13, = 4 per cent., medium; 15, = 5 per cent., doubtful; 13, = 4 per cent., loss; or, in other words, ninety-one per cent. regained useful vision, nine per cent. loss. Cataract-extraction in the capsule is a barbarous (!) procedure. If a cataract ripens too slowly, its maturation is hastened by delicate discision with perpendicular division of the capsule. Senile delirium was once observed. Three deaths as a result of pneumonia and fatty degeneration of the heart were noted. Steffan has seen six cases of sympathetic inflammation of the second eye after cataract-extraction in the other. In one case a perfect recovery was witnessed in both eyes, with S $\frac{1}{18}$ in the operated eye, but for fear of such a terrible complication as this, a unilateral cataract with intact vision in the other eye should never be extracted (!).

According to LEVISTE (449) the prognosis in the extraction of diabetic cataract is by no means so bad as many observers assume. While the percentage of losses in senile cataract varies from four to five, it may increase in the case of diabetic cataract to ten. We should wait until the patient is in a relatively good condition of health, and during the after-treatment the patient should be subjected to a strictly anti-diabetic course of medicine and diet.

GRADENIGO (446) washes and irrigates the eye with distilled water only in all operations, and is satisfied with his experience and method. In 108 extractions he had but two failures, whilst in previous years the losses were anywhere from five to seven per cent. DANTONE.

## VI.—RETINA AND FUNCTIONAL DISTURBANCES.

453. BIRNBACHER. Case of embolism of the central artery of the retina with the presence of cilio-retinal vessels. *C. f. A.*, Band vii., p. 207

454. DAVID. Essai sur les altérations fonctionelles et organiques de l'appareil de la vision survenant sous l'influence combinée de l'alcohol et du tabac. *Thèse de Paris*, 1883.

455. GAYET. D'une lésion congénitale de la rétine. Est-ce une rétinite pigmentaire? *Arch. d'ophth.*, tom. iii., 5.

456. GNAUCK. Case of heteronymous lateral hemianopsia. *Neurol. Centralblatt*, No. 9, 1883.

457. LANDESBERG (Philadelphia). On retinitis punctata albescens. *C. f. A.*, Band vii., p. 261.

458. SULZER. Four cases of retinal affection caused by direct observation of the eclipse of the sun on the 16th of May, 1882. *K. M. f. A.*, Band xxi., p. 129.

459. HOFFMANN. Case of amaurosis after hæmatemesis. *K. M. f. A.*, Band xxi., p. 171.

460. STILLING. On the origin of retinal detachment. *Arch. f. Augenh.*, vol. xii., p. 332.

461. ULRICH. A new ophthalmoscopic condition after hemorrhage. *K. M. f. A.*, Band xxi., p. 183.

LANDESBERG (457) adds three new cases to the six previously reported of retinitis punctata albescens. 1. Man, æt. fifty-three, blind in left eye for many years, numerous characteristic whitish-yellow exudations between the papilla and macula, together with larger extravasations below and inward from the papilla. Urine normal; recovery after the exhibition of potassic iodide with hydrarg. biniod. rub., with general dietetic treatment. 2. A man, æt. thirty-nine, similar picture, with numerous radiating hemorrhages in the retina of the right eye; slow recovery after treatment with pilocarpin. 3. Occurrence in both eyes of a man, æt. fifty-one, complicated with hemorrhages in the retina of the left eye. The treatment with Heurteloup and diaphoretics resulted in complete recovery. [White dots and smaller or larger patches in combination with retinal hemorrhages (apart from the fatty degeneration of extravasated blood) are not extremely rare, but different from Mooren's retinitis punctata albescens.—ED.]

STILLING (460) observed a case of retinal detachment without previous perforation, or the contraction of connective-tissue fibres. He believes, that it was caused by condensation of the entire vitreous body so that tension was exercised in all directions upon the retina.

ULRICH (461) met with a fresh case of *profuse hæmatemesis*, and observed that although the patient was extremely anæmic, yet the veins on the papilla were of a remarkably bright-red color, while upon the retina itself they appeared abnormally full. The neighborhood of the papilla was covered with numerous retinal hemorrhages, partly with a bright centre, while the macula was

surrounded by radiating whitish fibres. These symptoms disappeared entirely within a week or so. Ulrich explains this phenomenon by lack of proportion between the normal pressure of the vitreous and the blood pressure in the retinal veins, as a result of which the veins are pressed back against the papilla, and hemorrhage ensues.

Hoffmann (459) observed a case of blindness of long duration two days after the last attack of repeated profuse hæmatemesis. S gradually increased on the *right* side to $\frac{1}{3}$, while with the left eye movements of the hands only could be recognized at a short distance. Left papilla very pale, arteries narrow. Right papilla white above, the lower half being normal. The whole of the lower visual field was correspondingly lost. Strychnia injections had the most wonderful effect, for even on the third day S : R E = 1, while with the left eye fingers could be counted at 3 M. The same condition remained permanent, except that the visual field expanded a trifle. Hoffmann believes that all these cases of visual disturbances, occurring shortly after hæmatemesis, ought to be explained by assuming a localized inflammation of the optic nerve, whilst those which follow instantaneously any loss of blood must be referred to acute anæmia of the brain as well as to the subsequent diminution in the general bodily health and strength. Hemorrhages in the optic-nerve sheath or in the stem are accounted as great rarities. The site of the lesion is probably not at the optic papilla but at the optic foramen.

Gayet (455) describes the condition of the retina in a young man and his sister, aged thirteen. Their parents are cousins, and have, as all their other children, perfectly normal eyes. Hemeralopia and diminished vision are present in both cases, with well-marked temporal contraction of the fields and dyschromatopsia. The other senses are normal, with the exception of the memory for tones, as a result of which it is impossible for either patient to sing or whistle the simplest melody. The eyes externally, their media, and optic papillæ are essentially normal, but the entire fundus is thickly covered *with whitish glittering spots*, fewer in number and smaller in size around the macula, yet increasing in size and number toward the periphery. They lie invariably behind the retinal vessels. The right eye of the girl shows additionally to this same condition, a well-developed retinitis pigmentosa outward and upward, from which circumstance the author concludes that both of the cases are a variety of retinitis pigmentosa,

and that even in the usual form the immigration of pigment is not the essential nature of the disease.

SULZER (458) gives the clinical history of four patients who were *blinded by looking at the eclipse of the sun in the spring of* 1882. The symptoms were central scotoma, a hyperæmic and later an exudative condition of the macula lutea, which in one case continued for months, and led to pigment degeneration in the region of the yellow spot. A bibliography of cases observed by Mackenzie, Jæger, Arlt, Schirmer, Dufour, Haab, Emmert, and the experiments of Czerny, are added. The probable cause is scorching of the retina and choroid.

BIRNBACHER (453) observed a case of embolism of the central artery of the retina in a woman of forty three, which had occurred suddenly and without any appreciable cause (first tone over the aorta impure). The fundus, with total disappearance of the arteries and milky-white opacity of the peripheral retinal zones, exhibited its normal color around the macula for three P. D., and this was nourished by two small arterial twigs starting directly from the papilla. Central S was consequently preserved, while peripheral vision was lost. The symptoms gradually subsided, S increased to $\frac{6}{15}$, the field of vision became free, the distinction in color disappeared, but the two arteries did not change in calibre or color. The preservation of vision and perception of color around the macula lutea can be ascribed only to the presence of those two small cilio-retinal arteries which were given off by the central artery of the retina behind the embolism. Bibliography is annexed.

GNAUCK'S case (456) was that of a man, æt. thirty-five, who first noticed *a loss of* S in his left eye, and then in his right eye, extending over *the exterior halves of the visual field* in each eye. This disturbance gradually increased and spread over the inner halves until the left eye was totally amaurotic, the right highly amblyopic, while both optic nerves with the ophthalmoscope appeared to show atrophy. During this entire period the general bodily symptoms were trivial. With the fourteenth week of the disease the symptoms began to decrease from right to left, just in the same way as they had before progressed from left to right. The case terminated in temporal hemianopsia of both eyes, and a central defect in the color-perception of the *left* eye. The symptoms were probably caused by the growth of a neoplasm at the anterior angle of the chiasma, which, advancing rapidly at

first, caused diffuse inflammation of all the tissues surrounding the chiasma. This supposition easily explains the loss of conduction by the nerves, and the amaurosis.

DAVID (454) describes alcohol and tobacco amblyopia. In one of his six conclusions he asserts that Daltonism in alcoholic intoxication depends on *diminished* perception, and not upon an *abnormal* perception. MARCKWORT.

## VII.—OPTIC NERVE.

462. EALES. Exophthalmos and optic neuritis. *Brit. Med. Jour.*, March 24, 1883, p. 566.

463. GILLET DE GRANDMONT. De l'action des courants électriques continus appliqués au voisinage du cerveau et des résultats qu'ils produisent en particulier dans l'œil. *Rec. d'ophth.*, 1883, No. 7.

464. HOCK. Contributions to the doctrine of retro-bulbar neuritis. *Wiener med. Blätter*, No. 1813, p. 20.

465. JANNIN. Considérations sur une forme mal définie de stase papillaire aiguë. *Thèse de Paris*, 1883.

466. VOSSIUS. Bilateral optic atrophy after embolism of the central artery of the retina. Insufficiency of the mitral valves. *K. M. f. A.*, Band xxi., p. 298.

VOSSIUS (466) saw amaurosis suddenly developed in the left eye of a woman, with insufficiency of the mitral valve, eight days before delivery, and a similar condition in the right eye during childbirth. The amaurosis soon subsided and S rose to $\frac{2}{3}$; both papillæ were characteristically white; the field of vision was defective downward and inward, as well as upward and outward. There must have been a bilateral embolism of the central artery of the retina, with more rapid restoration of collateral circulation in the right eye.

JANNIN (465) describes a case of bilateral optic neuritis in his own person, as diagnosticated and observed by Panas; considerable œdema of the papillæ and extreme amblyopia; energetic autophlogistic treatment was resorted to. Recovery after several months.

According to HOCK (464), we must make a distinction, in cases of retro-bulbar neuritis, between the peripheral, which chiefly affects the periphery of the visual field, and the axial, which affects the centre of the retina. The experience which has been so far

gained, shows that in the latter condition the affection is situated on the temporal side of the optic nerve and close to the eyeball. If the inflammation has affected the entire trunk of the optic nerve, and if the path along which the retinal impressions are usually conducted has been entirely cut off, in other words, if amaurosis has been produced, then such a neuro-retinitis must be regarded as total. Axial neuritis is mostly of a chronic character, while the peripheral is generally acute or subacute. If the neuritis appears with the picture of papillitis, we find at first a peripheral contraction of the field, followed by diminution of central vision, and usually accompanied with a feeling of pain around the eye. The latter is probably due to a simultaneous affection of the sheath of the optic nerve. Taking cold is presumably one of the most frequent causes of these attacks, yet inflammatory affections of the dura and of the periosteum of the optic foramen must exercise a considerable causative influence. Mention is made of a constant symptom, contraction of the lids from reflex spasm of the orbicularis. Hock has frequently observed the chronic form of retro-bulbar neuritis after severe injuries to the head, in which the peripheral contraction of the field was much more noticeable than the decrease of central vision. If the disease has not reached the chronic stage, it is best to keep the patient for a long time in a darkened room and to subject him to a course of mercurials. Even if the disease has lasted for three months, we may still hope for a perfect recovery, while we should not forget that occasionally, though rarely, vision may spontaneously improve after long-continued amaurosis.

EALES (462) reports the case of a girl of fourteen years who was suddenly attacked with increasing *exophthalmos in connection with optic neuritis*. A few days afterward a mass of putrid pus escaped from the right nostril, and the exophthalmos at once disappeared. No syphilitic infection could be proved, nor was the patient strumous. Eales thinks that there must have been caries of some part of the bones lying between the nasal cavities and orbit. FITZGERALD.

### VIII.—INJURIES, FOREIGN BODIES, PARASITES.

467. BOURNEVILLE. Case of extraction of a piece of gun-cap. *C. f. A.*, Band vii., p. 132.

468. KASAUROW. Foreign bodies in the iris. *Wratsch*, 1883, No. 25.

469. MAKROCKI. Three cases of cysticercus subconjunctivalis, with remarks on the histological structure of the capsule. *K. M. f. A.*, Band xxi., p. 329.

470. WEISS. Extraction, by means of an electro-magnet, of a bit of iron four *mm.* long, passing through the anterior chamber and clinging firmly to the iris. *K. M. f. A.*, Band xxi.,p. 364.

471. WHERRY. Removal of a piece of steel by the ordinary electro-magnet. *Brit. Med. Jour.*, Jan. 6, 1883, p. 10.

472. ZOHL. On the favorable action of the magnet in the removal of pieces of iron from the interior of the eye, with report of a case under his own observation. *Inaug. Dissert.*, Greifswald, 1883.

KASAUROW (468) saw a bit of *copper-cap lying on the iris*, and on the eighteenth day after it had penetrated the eye extracted it through a corneal incision without iridectomy. Successful result. S = $\frac{6}{12}$.

BOURNEVILLE (467) extracted, at the second attempt with the forceps, a piece of gun-cap three *mm.* long and fifteen *mm.* wide, which had passed through the corneo-scleral margin into the vitreous. The irritation, which had been at first but slight, increased after the extraction, and enucleation had to be performed on the fourteenth day on account of dangerous ciliary symptoms. A thin membranous exudation was found at the lower portion of the ciliary body between the two wounds.

WEISS (470) reports the extraction of a foreign body which passed through the cornea and anterior chamber and rested upon the iris. It could not be extracted through the corneal wound. In order to prevent the point from injuring the capsule, as would have happened when the anterior chamber was evacuated, he drew the foreign body forward with a magnet while the incision into the cornea was made.

WHERRY (471) easily extracted with a magnet, armed with two sharp points, a piece of steel which rested upon the iris.

FITZGERALD.

ZOHL (472) gives an account of the extraction from the vitreous of a piece of iron 4 *mm.* long and 2 *mm.* wide, which could not be located with the ophthalmoscope. Sixteen days later the patient was discharged with S = 1.

MAKROCKI (469) describes three cases of cysticercus under the conjunctiva, in two boys and a girl, all between three and four

and a half years of age. The entozoön was observed twice at the lower fold, once between the cornea and semilunar fold. The inflammation had been noticed in one case for eight days, in another for more than three months. The microscopic examination showed that the walls of the cyst consisted of a connective-tissue stroma with elastic fibres, the inner and outer surfaces of which were covered with a close network of capillaries.

## IX.—OCULAR AFFECTIONS IN GENERAL DISEASES.

473. ALEXANDER. Bilateral papillitis in a case of cerebral abscess. *Deutsche med. Wochensch.*, No. 23, 1883.

474. DEUTSCHMANN. Cerebral abscess with bilateral congested papilla, basilar meningitis and perineuritis and interstitial descending neuritis. *V. Graefe's Archiv*, Band xxix., 1, p. 292.

475. DUBELIR. A case of blindness and exophthalmos after malaria. Relieved by quinia. *Med. Oboscenije*, May, 1883.

476. HIRSCHBERG. Case of puerperal septic embolism of both eyes. *C. f. A.*, Band vii., p. 259.

477. LANDESBERG. Diseases of the eyes in connection with normal menstruation. *C. f. A.*, 1883, p. 134.

478. LEBER. A case of hydrocephalus, with atrophy of the optic nerve and continual dropping of watery fluid from the nose. *V. Graefe's Archiv*, Band xxix., 1, p. 273.

479. LUSSANA. Ishæmic amblyopia from abdominal venous stasis. *Gazz. Med. Ital. Prov. Ven.*, vol. xxvi., No. 21, May, 1880.

480. MACKENZIE. The eye, in cases of intracranial disease involving the medulla oblongata. *Brit. Med. Jour.*, March 3, 1883, p. 408.

481. METAXAS. Des troubles oculaires dans la grossesse et l'accouchement. *Thèse de Paris*, 1883.

482. PARINAUD. Paralysie des mouvements associés des yeux. *Arch. de neurol.*, tom. xiv., p 145.

483. RAMPOLDI. On the relations between cutaneous maladies and those of the eye. *Ann. Univ. de Medicina*, vol. cclxiii, 1883.

484. SALTER. Nephritis of pregnancy affecting vision. *Brit. Med. Jour.*, Feb. 24, 1883, p. 451.

485 THOMSON. Case of fracture of the skull in which conjugate deviation of the eyes, which had existed for four months, was removed by trephining. *Brain*, April 1883, p. 99.

486. Vossius. A case of recovery from meningitis after enucleation of an eye which had not been affected with suppurative panophthalmitis. *K. M. f. A.*, Band xxi., p. 237.

487. Vossius. Case of injury to the tubera ischi, with subsequent amaurosis, confined almost exclusively to the right eye.

488. White. Retinal hemorrhages in scurvy. *Brit. Med. Jour.*, March 3, 1883, p. 410.

Alexander (473) enriches our knowledge of the occurrence of papillitis in cases of cerebral abscess by an interesting case in which the patient, æt. nineteen, had been affected previously with articular rheumatism, and during the time of observation exhibited increasing symptoms of a cerebral disease, which was indicated by psychical alterations, violent headache, and a high degree of central disturbance of vision. Well-marked papillitis was present in both eyes. A brief remission was suddenly followed by a terribly violent exacerbation of all the symptoms, together with paralysis of the left abducens. Death rapidly supervened. A large abscess four *cm.* long and six *cm.* wide was found in the gray substance of the *right cerebral lobe.* It had evidently been developed from two smaller cavities. The chiasma and both optic nerves were œdematous. The mitral valve showed numerous button-shaped excrescences. The abscess was originally due, in Alexander's opinion, to an embolic process which secondarily had excited the papillitis.

Deutschmann also (474) gives us a new case of the rare occurrence of *cerebral abscess with congested papilla*, together with the results of the post-mortem examination, in a boy, æt. nine and one-half years, who fell some distance, met with a contusion of the skull, and was attacked wtth cerebral symptoms. The papillæ showed incipient neuritis. About six weeks later the symptoms increased, left-sided abducens paralysis was noticed, and well-marked papillitis with decrease of vision. Death in convulsions soon followed. Two abscesses as large as pigeon's eggs, communicating one with another, and furnished with walls as hard as cartilage, were found in the region of the left anterior cerebral lobe, corpus striatum, and a part of the optic thalamus. Suppurative basilar meningitis. Both optic tracts were flattened. The optic-nerve sheaths on both sides were largely distended and filled with fluid. The case was probably one of perineuritis and optic neuritis, due to extension of the meningitis which accompanied the abscess.

LEBER's case (478) of optic-nerve atrophy with continual discharge of watery fluid from the nose was observed in a young girl of fifteen, with hydrocephalus, who had suffered for nearly a year from visual disturbances, attacks of vertigo, epileptic attacks, and periodical headaches. Double atrophy of the optic nerves was discovered. This condition persisted for about five years, when a watery fluid began to trickle from the nose, drop by drop. The vertigo and headache had gradually disappeared, while the epileptiform attacks appeared only once in three months. In the meanwhile, absolute amaurosis had developed in the right eye, while the left eye showed amblyopia of a high degree. The sense of smell was entirely lost. The fluid escaped from the left nostril only, to the amount of $4\frac{22}{100}$ cubic centimetres hourly. Microscopically and chemically it appeared to be of the same character as the cerebro-spinal fluid.

MACKENZIE (480) reports three cases of *intracranial disease with affection of the eye.* The first case was one of syphiloma of the medulla oblongata, which had caused paralysis of the soft palate, tongue, vocal cords, and trapezius and sterno-cleido muscles of the left side. The left pupil was much more contracted than the right, but both reacted nicely to light and in accommodation. Vision and ocular movements were normal. The optic papillæ appeared to have been previously affected with optic neuritis. The second case was that of a tumor of the base of the brain, with paralysis of the third, fifth, sixth, and seventh pairs on the right side, and of the third, sixth, and eighth pairs on the left side, with periodical paralysis of the soft palate as well as of the vocal cords. Neuritis first in the left, then in the right, with subsequent retrogression in the latter. The third case was that of a tumor of the medulla oblongata, with paresis of the lips, tongue, soft palate, *partial left-* and *periodical right-sided* hemiplegia, and bilateral optic neuritis.

According to THOMSON (485), a boy of fourteen years had his skull crushed in so deeply that there was a fracture of the left parietal bone. Severe cerebral symptoms persisted for three weeks when at last consciousness returned, but for two months the patient could not voluntarily open his eyes. When finally opened they showed conjugate deviation to the right, and so extensive that the cornea was concealed behind the right external canthus. As it was supposed that the parietal bone was pressing upon the left cerebral hemisphere, the bone to which the injury was confined

was trephined, and two pieces of the lamina vitrea, which had been pressing upon the cerebral cortex, were removed. The subjective condition of the patient was better directly after the operation, but the objective symptoms of deviation of the eyes only decreased with slowness, and did not entirely disappear for fourteen months after the injury. And yet, even then, the rectus externus of the left side remained in a condition of paresis, and vision in the left eye was totally lost. The ophthalmoscope revealed atrophy of the optic papilla.

PARINAUD (482) describes the following case: In the beginning, paralysis of convergence and accommodation without mydriasis; later, double optic neuritis. Violent headache and trembling of the left arm were followed by trembling of the lip and of the lower maxillary, and by epileptiform convulsions. At the autopsy a tumor was found at the outer side of the pedunculus cerebri, which had been previously diagnosticated by Charcot.

After a boy, aged seventeen, had met with a violent fall upon the tubera ischii, VOSSIUS (487) observed amaurosis of the right eye in three days, although the bodily health had not appeared to be seriously affected. The pupil was widely dilated, and did not react; the fundus oculi was normal. After injections of pilocarpin slight perception of light was noticed in the median field of vision, and the pupil began to react. Three weeks later atrophic discoloration of the optic nerve was recognized; a month later fingers could only be counted at two feet distance. Vision, however, gradually improved until about four months after the injury, when a left-sided hemiplegia came on, but gradually again disappeared under appropriate treatment. There had probably been a fracture of the base of the skull passing through the foramen opticum, followed by a chronic circumscribed inflammation of the meninges, or an affection of the cerebral substance in the right island of Reyl.

VOSSIUS (486) also saw a case of absolute glaucoma in one eye and chronic glaucoma in the other, and performed iridectomy in both. Later, on account of the irregular recovery of the amaurotic eye, enucleation became necessary, but was followed by a terrible attack of maniacal meningitis. The final result was, however, excellent. The orbital wound must in some way have become infected. The globe burst during the enucleation, and dacryo-cysto-blennorrhœa had previously been well marked.

LANDESBERG (477) observed a case of herpes of the cornea in

connection with normal menstruation. For six successive menstrual periods the cornea, sometimes of one eye, sometimes of both, exhibted an eruption of papules, with more or less extensive infiltration of the surrounding tissues. The case was finally cured. He also saw a young negro girl, aged fourteen and a half, whose anterior chambers filled with blood during four successive menstrual periods. Vision was seriously affected for the time being, but restoration was always accomplished in about ten days without any especial treatment. Pregnancy soon followed, and there was no further trouble in the eyes.

METAXAS (481) describes a long series of diseases of the eyes which may ensue as a result of pregnancy: conjunctivitis, ulcer of the cornea, iritis, asthenopia, cataract, puerperal irido-choroiditis, hemorrhagic glaucoma, retinitis albuminurica, retinal hemorrhages, retinal embolism, detachment of the retina, optic neuritis, atrophy of the optic nerves, etc. (In many of the cases reported there is no scientific demonstration that pregnancy had any thing whatever to do with these diseases of the eyes.—REV.)

MARCKWORT.

HIRSCHBERG (476) observed *puerperal septic embolism* in both eyes of a primipara, in whom the ocular symptoms did not appear until thirteen days after the first chill. On the next day he observed exudative iritis and amaurosis of the left eye, amblyopia of a high degree in the right eye, with an elastic, tumor-like detachment of the retina in the right eye, due to metastatic embolism of the choroid; total amaurosis in both eyes, six days later. A sharply defined ring-abscess was developed on the margin of the left cornea; death.

WHITE (488) gives the details of a case of scurvy with retinal hemorrhages, of which he had seen twenty. During appropriate treatment for the scurvy the hemorrhagic spots gradually fade away.

LUSSANA (479) cured a troublesome amblyopia, which, according to the ophthalmoscope, depended upon poverty of blood in the retina, and was especially felt when standing upright, by letting the patient wear a broad abdominal belt. The patient suffered particularly from congestion of the portal system, which had developed from an extraordinary pendulous relaxation of the abdominal walls after repeated pregnancies. The amblyopia disappeared, and recovery was still present after five years.

DANTONE.

DUBELIR (475) observed a patient whose left eyelid was œdematous, and the left eyeball extremely exophthalmic and blind. The conjunctiva was hyperæmic, and lachrymation profuse. Herpes of the lip and nose were well marked. Negative (?—REVIEWER) ophthalmoscopic condition. After large doses of quinia the exophthalmos disappeared, and vision became normal. The author is inclined to believe, with Memorsky, that exophthalmos may be caused by intermittent œdema of the retro-bulbar tissues dependent upon malaria. HIRSCHMANN.

# SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE FOURTH QUARTER OF THE YEAR 1883.

By H. MAGNUS, Breslau; C. HORSTMANN, Berlin; and A. NIEDEN, Bochum.

WITH THE CO-OPERATION OF

C. E. Fitzgerald, Dublin; E. Marckwort and P. von Mittelstädt, Antwerp; Dantone, Rome; Hirschmann, Charkow; S. M. Burnett, Washington; Schjotz and Ole Bull, Christiania, etc.

Translated by Drs. F. E. D'Oench and C. Zimmermann.

## I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

By H. MAGNUS, M.D.

### *a.*—TEXT-BOOKS, MONOGRAPHS, TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS.

489. Alcaba. La clinica oftalmologica del Dr. Osio. *La crónica oftalmológica*, Sept., 1883.

490. Eperon. *Revue d'ophthalmologie*, vol. x. Refraction and accommodation by Landolt and de Wecker. Traité complet d' ophthalmologie, vol. iii., 1. *Prog. méd.*, 1883, No. 1.

491. Eperon and de Lapersonne. Analyses bibliographiques. *Arch. d'ophth.*, vol. iii., No. 5.

492. V. Helmholtz. Scientific treatises. Leipzig, 1883, vol. i. 1021 pages with five lithographic plates. The volume contains the following articles, most of which have been published before, but not collectively.

First section—Optics. On the theory of composite colors, 1852.

On Brewster's new analysis of sunlight, 1852. On the composition of the colors of the spectrum, 1855. On the sensibility of the human retina for the most refrangible rays of sunlight, 1855. The measurement of the wave length of the ultra-violet rays by E. Esselbach, 1855. Mathematico-physical dissertations, 1867. The limitations of the power of the microscope, 1873. The theoretical limit of the power of the microscope, 1874. The theory of abnormal dispersion, 1874. Second section—Physiological Optics. Description of an ophthalmoscope for examining the retina of the living eye, 1851. A new simplest form of the ophthalmoscope, 1852. A hitherto unknown change occurring in the human eye during a change of accommodation, 1853. The accommodation of the eye, 1856. On color-blindness, 1859. On the contrast phenomena in the eye, 1860. The movements of the human eye, 1863. The normal movements of the human eye, 1863. The form of the horopter determined mathematically, 1863. The horopter, 1864. Remarks on the form of the horopter, 1864. The influence of the rotary movements of the eyes on the projection of the retinal images, 1864. The telestereoscope, 1857. Stereoscopic vision, 1865. The importance of the convergence of the eyes in estimating the distance of objects seen binocularly, 1818.

493. JEFFRIES. Our eyes and our industries. Fourth annual report of the State Board of Health, Lunacy, and Charity of Massachusetts. Boston, 1883.

494. IMKERT. De l'interprétation et de l'emploi du pouvoir dioptrique et de la dioptrie métrique en ophthalmologie. *Thèse de Lyon*, 1883.

495. KEYSER, Peter. Some ophthalmological observations during ten years' service in Wills' Eye Hospital. *Trans. Med. Soc. State of Pennsylvania*, 1883. Philadelphia, 1883.

496. LEDDA. Una visita a diverse cliniche oculistiche italiane. Spallanzani, 1883.

497. NUEL. Notice sur J. Plateau. *Ann. d'ocul.*, Sept. and Oct., 1883.

498. Charts for recording ophthalmological investigations. Laupp, Tübingen ; 60 pages.

499. SCHROEDER. The question of detecting simulated blindness in one eye. *Berl. klin. Wochenschr.*, 1883, No. 44. The American stereoscope is provided with a slide, so that detection

is certain, even though the malingerer should close the eye claimed to be blind.

500. SIMI. Ottalmojatria. *Boll. d'ocul.*, vol. v., April, May, 1883. iv.–vii. lessons, including refraction and functional examination.

501. STEFFAN. The prevention of blindness, and remarks on Magnus' paper, "Blindness: its Cause and Prevention." *Deutsche Vierteljahrsschr. f. öffentl. Gesundheitspflege*, 1883, No.4.

502. ZEHENDER. How should we write and print so as to protect the eyes of our school-children? *Deutsche Revue*, Nov., 1883.

KEYSER (495) follows in his paper of forty-six pages, the example of Mooren, by publishing the results of his observations made in the course of several years. We hope his example will be followed at other American clinics. In the course of ten years he treated 5,243 patients and performed 1,282 operations; among them 148 cataract-extractions, 144 iridectomies, 92 tenotomies, 87 enucleations, and 3 neurotomies of the optic nerve and ciliary nerves. The extractions were performed according to v. Graefe's method, with the modification, probably practised now by every operator, of making the section entirely or at least partly in the cornea. Many interesting cases are reported in detail, but want of space prevents their consideration. BURNETT.

J. Plateau, Professor of Physics at the University of Ghent, died Sept. 15, 1883. NUEL (497) publishes an obituary in the *Ann. d'ocul.*, calling attention to his diligent researches in physiological optics, which he continued even after having become blind as the result of a dangerous experiment. In 1829 Plateau wanted to observe the effect of irritation of the retina and for this purpose gazed steadily at the sun for twenty seconds. Chronic iridochoroiditis resulted, followed by total blindness in the course of fourteen years. MARCKWORT.

The charts (498) for recording ophthalmological investigations can be highly recommended, as they are intended for all parts of the eye, including those externally visible. A chart, representing a vertical section, however, is wanting. In the chart intended for entering the appearance of the fundus the retinal blood-vessels seem too large; these are about the only improvements we would suggest. The price of sixty pages (fifteen cents) is a very low one. Each leaf is so arranged that it can be

removed from the book and put into the journal. I would also recommend to gum the back of the charts.

LAQUEUR and WEBER have lately maintained that German type is much more injurious to the eyes than Latin type. ZEHENDER (502) denies this. In regard to school-books he says: They should be printed only with such letters whose up stroke is about half the thickness of the down stroke; the letters should be square, or nearly so, and at a proper distance from each other. They should be 1.5–1.75 *mm.* high, the length of the line 80–100 *mm.*, the space between them 2.5 *mm.*; there should be 40–50 letters in a line. The letters of the primers should be considerably larger than heretofore.

### *b.*—STATISTICAL PAPERS.

503. DONDERS. Vier-en-twintigste jaarlijksch verslag betrekkelijk de verpleging en het onderwijs in het Nederlandsch Gasthuis voor ooglijders. Utrecht, 1883. 2,491 new patients; 286 operations.

504. GLEIWITZ. Third annual report of the society for maintaining the ophthalmic and aural institute for Upper Silesia at Gleiwitz. From Oct. 1, 1882 to Sept. 30, 1883. Gleiwitz, 1883. 1,893 new patients; 74 operations.

505. STEFFAN. Twenty-first annual report. Frankfort-a-M., 1883. 5,537 new patients; 406 operations. 23 peripheric extractions with a low flap, 21 of them entirely successful, 2 failures; 12 iridectomies, 30 squint-operations, 5 enucleations.

## II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

### By H. MAGNUS.

### *a.*—GENERAL PATHOLOGY AND DIAGNOSIS.

506. JAVAL. Quatrième contribution à l'ophthalmométrie. *Ann. d'ocul.*, Sept., Oct., 1882.

507. UHTHOFF. Contributions to the pathological anatomy of the eye. *Arch. f. Ophth.*, vol. xxix., 3. Contains the following contributions: Scleritis and episcleritis; Spring catarrh; Partial necrosis of the human cornea due to the introduction of fungi; Keratitis bullosa; Rare condition of two ciliary nerves in traumatic iridocyclitis with sympathetic iridochoroiditis of the second eye.

508. De Wecker and Masselon. La keratoscopie clinique. *Ann. d'ocul.*, Nov., Dec., 1883.

Javal (506) publishes another paper on astigmatism, determination of glasses, etc. The chapters on astigmatic accommodation, which partly corrects the corneal astigmatism, are particularly interesting. When the examination of a person for distant vision reveals an astigmatism which is the reverse of the corneal astigmatism, and when after the prolonged use of atropine the total degree of astigmatism approaches that of the corneal astigmatism, there has been an astigmatic spasm of accommodation, as Javal expresses it. The author calls attention to the fact that when injurious accommodation exists in myopia, it is customary to speak of a spasm of accommodation, while this expression is not used for latent hyperopia. Javal frequently prescribes convex glasses for young myopes with M<4D of such focal length that the far point lies at 25 *cm.*, thus avoiding every effort at accommodation. Marckwort.

Wecker and Masselon (508) have modified the astigmometer previously described by them (*cf. Ann. d'ocul.*, July and Aug., 1882, March and April, 1883, and *Arch. f. Augenheilk.*, vol. xii., p. 345, vol xiii., p. 274) for the purpose of measuring the degree of astigmatism. They proceed as follows: A white square frame is held at a certain distance from the eye to be examined, and its image upon the cornea observed. This image is also a square upon a cornea of normal curvature, but becomes a rectangle on a cornea with regular astigmatism when the square is turned in such a manner that the astigmatic axis of the cornea is parallel to two sides of the square. By means of screws two opposite sides of the square can be approached, changing it into a rectangle. This is continued until the image on the cornea for a certain position of the instrument has become a square. A hand on the back, also moved by a screw, indicates the degree of astigmatism. Wecker and Masselon are opposed to Martin's view, according to whom a large proportion of corneal affections generally considered scrofulous is the result of astigmatism (*cf. Ann. d'ocul.*, 1883, vol. xc., p.14, and *Arch. f. Augenheilk.*, vol. xiii., p. 316, rep. and cp. No. 570). Marckwort.

### *b.*—THERAPEUTICS.

509. Alvarado. Consideraciones generales prácticas acerca de la operacion de la catarata.—*La crónica optalmológica*, July, 1883.

510. DIANOUX. La malaxation de l'œil après la sclérotomie. *Arch. d'ophth.*, vol. iii., No. 5.

511. GILLET DE GRANDMONT. L'occlusion antiseptique en chirurgie oculaire.—*Ann. d'ocul.*, Sept., Oct., 1883.

512. GRIFFITH HILL. A series of electro-magnet cases.

513. LANDESBERG. On stretching of the optic nerve, *Arch. f. Ophth.*, vol. xxix. Was performed in twenty-one cases; four apparently good results seem to be of a very doubtful nature.

514. NICATI. Notes de chirurgie oculaire. *Arch. d'ophth.*, vol. iii., No. 5.

515. PAGENSTECHER. The importance of Wiesbaden as a resort for eye patients.

Balneological studies on Wiesbaden. Published by Dr. Pfeiffer. Wiesbaden, 1884.

516. SANTOS FERNANDEZ. Del reflejo palpebral en la anestesia par el cloroformo. *Crónica médico-guirúrgica de la Habana.* Oct., 1883.

517. SCHNABEL. On mental disturbances after operations on the eye. *Ber. d. Innsbruck. naturwissensch.-med. Ver.*, vol xiii. Twelve cases of mental disturbance among 183 extractions.

518. DE WECKER. De l'emploi de la lumière électrique en chirurgie oculaire. *Rev. clin. d'ocul.*, Oct., 1883.

GILLET DE GRANDMONT (511) describes a bandage which he calls "occlusion antiseptique." It consists of a small cotton compress, hygroscopic gauze, some crystallized boracic acid, and carbolized gauze; the whole is pasted down with collodium. This bandage, which remains unchanged for three to four days is used by him in superficial keratitis, deep corneal ulcers, in certain operations—for instance, paracentesis, keratotomy, iridectomy, peritomy, and in all operations on the lids and in stretching nerves. As the symptoms of irritation in the corneal affections just mentioned decreased, the instillation of atropine and other remedies was not so often necessary. MARCKWORT.

According to PAGENSTECHER (515) the use of the waters of Wiesbaden is advisable in chronic iritis and irido-choroiditis, and in all syphilitic affections of the eyes; in the latter they are a material aid to inunction. From thirty to forty baths should be taken, to be repeated for three or four years. The baths should not be begun with during an attack or immediately after it, but

six to eight weeks later. Moderate drinking of the water may be combined with the baths. They are contra-indicated in all affections combined with or disposing to hemorrhages of the retina and choroid; also in glaucoma, detachment of the retina, and all inflammatory affections of the conjunctiva and cornea.

The drinking-cure, without baths, is indicated in all affections of the eye due to congestive conditions of its inner or outer membranes, especially when complicated with affections of the stomach, intestines, liver, or uterus; also in the results of chronic inflammation of various parts of the eye combined with exudation—for instance, opacities of the vitreous, choroiditis at the macula, chronic glaucoma, recurrent kerato-conjunctivitis, etc.

De Wecker (518) recommends concentrated bright light for cataract-operations, and especially for the steps following the extraction. The photophore électrique of Trouvé is especially adapted for this. The apparatus consists of a lamp in a metallic cylinder bearing at one end a complex lens, at the other a reflector.

## III.—INSTRUMENTS AND REMEDIES.

By H. MAGNUS.

### *a.*—INSTRUMENTS AND TECHNICAL CONTRIVANCES.

519. Bagnesis. Emploi des verres correcteurs en ophthalmologie. *Thèse de Paris*, 1883.

520. Bedwin. Sur l'emploi du pulvérisateur dans le traitement des affections externes des yeux. *Bulletin général de thérap.*, vol. iv., 4.

The reviewer would like to call attention at this point to the excellent apparatus constructed by Dr. Kabierske, Jr., in Breslau, for dusting in powder. I have used it exclusively during the last few months for dusting in calomel, and have convinced myself of its excellence. The calomel is evenly distributed over the conjunctiva, and never collects in lumps. The apparatus is described and illustrated in the *Centralbl. f. Chirurgie*, 1883, No. 33. It is easily handled, and the calomel, being enclosed in a glass capsule, never becomes moist. I earnestly recommend the little apparatus.

521. Landolt. Une boite d'instruments (fine). *Arch. d'ophthal.*, vol. iii., No. 5.

522. Oliver, C. A. Description of a rotating disc for testing for astigmatism. *Med. News*, Oct. 6, 1883.

523. NACHET, Jr. Opthalmoscope à bouton automatique. *Ann. d'ocul.*, Sep., Oct., 1883.

524. PARENT. Description d'une opthalmoscope à verres cylindriques (nouveau modèle). *Rec. d'ophth.*, vol. iv., No. 11.

525. RODENSTOCK. Spectacles, their selection and use, especially as regards myopia and its treatment. Würzburg, 1883.

526. SCHJÖTZ. Ophthalmoscope. *Norsk. Mag.*, 1883, p. 221.

NACHET, Jr. (523), some time ago made an ophthalmoscope according to Javal's directions, resembling that lately constructed by Guéride, and described in the *Ann. d'ocul.* (July–Aug.). The disc containing the lenses is not revolved directly, but indirectly, as the thumb moves a little button at the upper end of the handle.

MARCKWORT.

The apparatus of OLIVER (522) consists of a disc with three concentric series of radiating lines corresponding in size with three visual angles. Two of Pray's letters are attached to a rotating disc-perimeter, the one at an angle of 90°, the other at an angle of 180°. The patient must designate the lines he sees most plainly. One of the letters is then turned until it reaches an angle at which it appears more distinct than the other at right angles with it.

BURNETT.

PARENT (524) has slightly altered the ophthalmoscope constructed by him and described in the *Rec. d'ophth.* (Sept., 1880), in order to protect the cylindrical glasses it contains against dust. He uses either a small plane mirror set at an angle of35°, or a similarly set concave mirror with a focal length of 8 or 15 *mm.*

MARCKWORT.

The object of RODENSTOCK's (525) paper has remained an absolute mystery to us. It contents are so meagre that the public at large can profit but little from it. It contains nothing new, and if the author expresses a hope in the preface that the oculist will find new results of investigation in the 26 pages of print we can safely say that such a hope is entirely false. Our colleagues, however, will be surprised by the attacks made by Rodenstock on ophthalmologists. The impartial reader must gain the impression that Rodenstock desired to forward the interests of opticians to the detriment of oculists. The popular presentation of medical subjects can be of benefit only if it induces the patient to seek the aid of a physician ; under such circumstances we unhesitatingly indorse it. But if the object is to inspire distrust of the

physician, we consider it our duty to energetically oppose such publications. For this reason only we devoted so much space to Rodenstock's article.

*b.*—REMEDIES.

527. ANDEER. Resorcin and its application to the organs of sense. *Petersb. med. Wochensch.*, 1883. It is used as a salve of from 1–20 %, especially in affections of the cornea, *e. g.*, pannus, corneal ulcer.

528. V. ROTHMUND. Some remarks on the use of sublimate. Essay dedicated to the Medical Society of Munich by its members in honor of its fiftieth anniversary. Munich, 1883.

529. SANTOS FERNANDEZ. Nota acerca de las per turbaciones oculares produides por la quinina. *La crónica oft.*, 1883.

According to ROTHMUND (528) a sublimate solution of 1.0 : 5000 has the same antiseptic power as a saturated solution of boracic acid, without irritating the conjunctiva. It is also much cheaper than any other antiseptic solution. Rothmund has used it for some time in the following manner: before every operation the conjunctival sac is cleansed with a solution of sublimate 1 : 10000, as well as the surroundings of the eye. The operator and his assistants wash their hands in a solution of 1 : 500. The instruments are disinfected in absolute alcohol. After the operation the conjunctival sac is again washed out with the weak solution of sublimate, and the wound also. This process is repeated every time the bandage is changed, until the wound is finally closed. The slightest traces of conjunctival secretion are removed with the greatest care whenever the bandage is renewed. Sublimate has also proved efficient in corneal ulcers, both in the form of applications and of direct cleansing of the ulcer with a brush. It also acted favorably in serpent ulcers.

## IV.—ANATOMY.

### By Dr. H. MAGNUS.

*a.*—GENERAL ANATOMY AND EMBRYOLOGY.

530. DENICKER. Coloration des cheveux et des yeux. Soc. d' anthropologie, May 17, 1883. *Progr. méd.*, 1883, No. 24.

531. GEWITSCH. The anastomoses of the veins of the face and orbit. *Arch. f. Ophth.*, vol. xxix., No. 4.

532. KÖLLIKER. The development of the eye and organ of smell in human embryos. *Transactions of the Phys.-Med. Soc. of Würzburg.*, vol. xvii.

533. KÖNIGSTEIN. The development of the eye. *Wiener med. Blätter*, 1883, No. 49.

534. SCHENKL. Case of congenital monophthalmus. *Prager med. Wochenschr.*, 1883, No. 48.

DENICKER (530) read a paper of Ikof, according to which there are two kinds of pigment in the eye : a blue pigment, lying in the uvea itself and derived from the ectoderma ; and a black pigment, contained in the stellate cells of the iris and coming from the mesoderma. The color of the iris depends on the greater or less amount of one or the other pigment. MARCKWORT.

KÖNIGSTEIN (533) discusses the development of the lashes and Meibom's glands. Soon after the closure of the palpebral raphe the lashes begin to develop, the cylinder-epithelium dipping in. Meibom's glands begin to develop in a similar manner at the commencement of the fourth month. The sudorific and sebaceous glands of the lashes seem to be developed at the end of the fifth month.

### *b.*—VITREOUS AND LENS.

535. CZERMAK. Case of an arterial loop and expansion of the retina, penetrating into the vitreous. *Centralbl. f. prakt. Augenheilk.*, Oct., 1883.

536. HIRSCHBERG. Case of persistence of the fœtal blood-vessels of the vitreous. *Centralbl. f. prakt. Augenheilk.*, Nov., 1883.

537. PRIESTLEY SMITH. On the growth of the crystalline lens. *Ophth. Soc. Transactions*, iii.

538. ROBINSKI. Contribution to the knowledge of the lens and the methods of examining it. Berlin, 1883, 60 pp., 8vo. The first part is entirely of a polemic and critical nature ; the second contains four previously published essays.

### *c.*—RETINA AND CHOROID.

539. AYRES. W. C. The circulation of the blood in the region of the macula lutea. These ARCH., vol. xi., 476. *Arch. f. Augenheilk.*, vol. xiii., 1.

540. OGNEFF. The molecular layer and the so-called reticulated substance of the retina. *Centralbl. f. d. med. Wissench*, 1883, No. 45.

541. WEISCHER. Contribution to the muscles of the iris. Inaug. Diss., Greifswald, 1883.

*d.*—OPTIC NERVE AND CENTRAL ORGANS.

542. BURDACH. The decussation in the chiasma and optic-nerve tracts. *Arch. f. Ophth.*, vol. xxix., 3.

543. V. MONAKOW. Experimental and pathologico-anatomical examinations into the relations existing between the so-called visual sphere and the infra-cortical optic centres and the optic nerve. *Arch. f. Psychiatrie*, vol. xiv., 3.

544. VOSSIUS. Contributions to the anatomy of the optic nerve. *Arch. f. ophth.*, vol. xxix., 4.

According to the investigations of MONAKOW (543), the optic nerve of the rabbit is in close connection with the third and fifth layers of the gray substance of the occipital lobes through the infra-cortical centres, and it is very probable, therefore, that these layers are of preëminent importance for the visual act. Monakow obtained similar results with young cats. After removing certain portions of the so-called visual sphere in new-born cats, evidences of checked development became apparent when the animals had grown up, which principally affected the infra-cortical visual centres and extended into the optic nerves. The atrophy of the optic nerves after extirpation of the visual centre is secondarily due to the degeneration of the ganglion cells in the pulvinar and outer corpus geniculatum, primarily to the disappearance of the gray reticulum in those organs.

VOSSIUS (544) sums up his results in the following sentences: 1. The central blood-vessels enter the optic nerve 10–12 *mm.* behind the globe from below, in the lower outer quadrant. 2. In certain animals (sheep, calf, cat, pig, rabbit) the central blood-vessels also enter from below, but more in the outer half. 3. There has therefore been a change of position as compared with the condition in the embryo, where the fœtal ocular fissure lies in the lower inner quadrant. The optic nerve must therefore have turned through an angle of 90° at least. 4. This change in the position of the blood-vessels is a strong argument in favor of the theory that the macula lutea is a remnant of the fœtal ocular fissure. 5. Not only the optic nerve, but also the globe, is rotated, as can be demonstrated from the superior rectus, which in the embryo is situated laterally, in the adult more under the middle of the roof of the orbit. The torsion is due to the fact that the ocular vesicle is pushed from its lateral forward into the parallel position of the visual axes, and also to the disproportion between the

longitudinal growth of the optic nerve and its share in the length of the orbital axis. 6. While in man the optic nerve enters the globe at the posterior pole in the lower inner quadrant, and the posterior long ciliary arteries lie almost exactly in the horizontal meridian, the optic nerve in the animals named above, except the cat, enters to the outward from the vertical meridian, but in the cat to the inward—in the calf, cat, pig, and sheep, below the horizontal meridian, in the rabbit above it. In the cat the long posterior ciliary arteries lie in the horizontal meridian, in the other animals below it. 7. The intracranial portion of the nerve is mainly supplied with blood from the art. corporis callosi. In the optic canal there is an abundance of blood-vessels and interstitial connective tissue. The arterial blood-vessels come from the ophthalmic artery and its branches to the muscles; they are attached to the lower surface of the nerve. The venous blood enters the cavernous sinus through the posterior central vein, which leaves the nerve close to its entrance into the optic canal. 8. The central retinal artery contributes to the nourishment of the posterior orbital portion of the nerve through a larger recurrent branch which is accompanied by a vein emptying into the central retinal vein. The development of an inflammation in this region is greatly favored by the conditions of circulation and nutrition in the optic canal, the extensive development of septa, the nearness of the nerves and their connection through loose meningeal tissue, so that a retrobulbar neuritis can rapidly develop in both nerves simultaneously or in quick succession, passing from one nerve to the other without affecting the chiasma. The fact that the inflammation is most intense in the central portion of the cross-section, in which the fibres supplying the macula lutea lie, and thus affects these fibres more severely than the peripheric ones, can be explained by taking into consideration that the trunks of the entering blood-vessels lie in the periphery, their capillary terminations in the centre.

### *e.*—COMPARATIVE ANATOMY.

545. Bellonci. Les lobes optiques des oiseaux. *Arch. italiennes de biol.*, vol. iv.

546. Ciaccio. Sopra una notabile particolorità anatomica che c' è nell' occhii del Pesa Spada. *Spallanzani*, June, July, 1883.

547. Kitt. The anatomy and physiology of the tear-ducts of the horse and ox. *Zeitschr. f. vergl. Augenheilk.*, vol. ii., 1.

548. KOSCHEL. On the shape, position, and proportions of the orbit, the globe, and crystalline lens of the domestic animals. *Zeitschr. f. vergleich. Augenheilk.*, vol. ii., 1.

549. MAYERHAUSEN. Unusually long persistence of the tunica vasculosa lentis in rabbits. *Zeitschr. f. vergleich. Augenheilk.*, vol. ii., 1.

550. MÖNNICH. On the physico-optical construction of the eye of the ox.

551. TAFANI. Andamento e terminazione del nervo ottico nella retina dei coccodrilli (champsa Lucius). *Boll. d'ocul.*, vol. vi., 1, 1883, conclusion.

552. WÄLCHLI. The topography of the colored globules in the retina of birds. *Arch. f. Ophth.*, vol. xxix., 3.

According to CIACCIO (546) there is a canal 3 *mm.* wide at the outer edge of the iris in the sword-fish, extending around the whole circumference and connecting at the temporal side with the anterior chamber through an opening 5 *mm.* wide. The author found the canal filled with aqueous, and thinks it is an emissary analogous to Fontana's canal, which brings the aqueous humor again into circulation. DANTONE.

Want of space prevents us from reporting more than the following on the exhaustive paper of KOSCHEL (548): In the domestic animals the orbit is in direct connection upward with the temporal fossa, backward with the spheno-palatine fossa. In solipeds and ruminants a complete bony ring forms the entrance to the orbit. In the ox, pig, and perhaps also the horse, the cavities named above are separated from the orbit by two well-defined bony ridges—the temporal fossa by the anterior, the spheno-palatine fossa by the posterior, orbital ridge. The apertures left thus by this imperfect occlusion are covered with a membrane, the peri-orbit, which passes over into the periosteum of the orbit at various points. This membrane contains muscular fibres, the antagonists of the muscles which draw back the eyeball. The bones of the orbit present very marked peculiarities in the various domestic animals, but want of space prevents recounting them. The cat has comparatively the largest orbit, followed by the sheep, pig, ox, and finally the horse. It is worthy of note that in all, the ratio between breadth and height is the same (1:1.1). In all animals examined the breadth and height of the left orbit exceeded that of the right by 0.2 to 3 *mm.*

The globe of domestic animals is flattened somewhat in its antero-posterior diameter, except in the carnivora. In the horse and ox the ratio of the antero-posterior diameter to the height is 1:1.1 ; in the sheep and pig, 1:1.08 ; in the cat, 1: 0.9 ; in the dog, 1: 0.9 to 0.95. The cat has comparatively the largest eye, and therefore the best relative vision, that of the dog being about equal to it. The sheep, pig, horse, and ox follow in the order named. Measurements of the radius of curvature of the horizontal meridian of the cornea and of the fundus gave the following results :

| | Horizontal Meridian of Cornea. *mm.* | Fundus. *mm.* |
|---|---|---|
| Horse . . . | 18.75 (Berlin, 19.5) | 25.5 |
| Ox . . . . | 16.8 | 23.5 |
| Sheep . . . | 12.75 | 18.65 |
| Pig . . . . | 11.0 | 15.8 |
| Cat . . . . | 9.5 | 11.8 |

The cornea of the carnivora has the greatest curvature. The cornea of the domestic animals is elliptic, least so in the carnivora, in which it is almost round. The cat has comparatively the largest cornea. The thickness of the sclera varies considerably. It is thickest in the middle, and gets thinner towards the edge ; the ox has the thickest cornea. The point of entrance of the optic nerve has been exactly calculated and shown in a table, which, however, cannot be reproduced here.

The diameter of the lens is 12.6 *mm.* in the horse, in the ox 12.0 *mm.*, in the sheep 10.4 *mm.*, in the pig 7.9 *mm.*, in the cat 7.8 *mm.* In all domestic animals the vertical diameter is a little shorter than the horizontal. The anterior surface of the lens is less curved than the posterior, except in the cat.

For the details of the excellent paper of MÖNNICH (550) I must refer to the text. It is of interest to note that the eye of cattle is myopic to a comparatively high degree, namely, 1.707 dioptries. Mönnich explains this by the fact that these animals spend most of their lives in the stable, and must constantly see near objects only.

According to WÄLCHLI (552) colored globules are found in the whole retina of finches, pigeons, and chickens ; in the cock more yellow ones also throughout the whole retina. Yellowish-green large globules occur only in the periphery of the retina. Colorless or slightly-colored small globules are found in it everywhere.

In the macula lutea there are small red, orange, and intensely yellowish-green globules very close together. The yellowish-green globules are especially numerous in the macula lutea and of a brighter color than those in the periphery. The action of the blue rays is thus reduced.

## V.—PHYSIOLOGY.

### By Dr. H. MAGNUS.

#### *a.*—GENERAL PHYSIOLOGY.

553. Bloch. Vitesse comparative des transmissions visuelles, auditives, et tactiles. *Comptes rend. hebd. des séances de la soc. de biol.*, No 33.

554. Borthen, Lyder.. Some remarks on perception and conception. *Klin. Monatsbl. f. Augenheilk.*, Nov., 1883.

555. Cohn. Examinations of acuteness of vision in diminishing light. *Breslauer aerztl. Zeitschr.*, 1883.

556. Graser. Monometric investigations into intra-ocular pressure, and the influence of atropine and eserine upon it. *Arch. f. experim. Path. und Pharmakol.*, vol. xvii., No. 5.

557. Leroy. Les signes focales dans la refraction oblique par une sphère et la théorie de Sturm ; réponse à M. professeur Matthiessen. *Rev. gén. d'ophth.*, 1883, No. 11.

According to Borthen (554) perception and conception are accomplished as follows : Perception takes place in the cell which is in closest communication with the nerve-fibre, conception in the cell anastomosing with it. In the latter the remembrance of this perception is preserved. The clearness of the remembrance depends upon the intensity with which the perception is impressed upon the cell. By assuming that a perceptive cell may be connected with several conceiving cells, it is easy to imagine that it is capable of receiving many perceptions, if it at once transfers them to other cells adapted to preserve them. It is doubtful, however, whether these two kinds of cells can be experimentally kept apart.

Leroy (557) defends Sturm's theory against the attacks of Matthiessen. He also makes some theoretical remarks on the visual acuteness of astigmatic eyes. Marckwort.

#### *b.*—PHYSIOLOGY OF THE LACHRYMAL ORGANS.

558. Gad. A revision of the teachings in regard to the con-

duction of tears and the movements of the lids. *Arch. f. Anat. u. Physiol.*, physiol. Abth., Supplement.

*c.*—RETINA AND CENTRAL ORGANS.

559. BECHTEREFF. The function of the corpora quadrigemina. *Wratsch*, 1883, No. 32–35.

560. MAYERHAUSEN. Contribution to the knowledge of the photopsias in the surroundings of the point of fixation. *Arch. f. Ophth.*, vol. xxix., 4; and: On a peculiar form of manifestation of the inherent light of the retina, with remarks on the point of equilibrium of the globe in the waking condition. *Arch. f. Augenheilk.*, vol. xiii., 1.

BECHTEREFF (559) experimented on frogs, birds, and dogs, by partially destroying the corpora quadrigemina (bigemina, respectively), as strictly verified by the autopsy. His investigagations prove that the functions of the corpora quadrigemina are visual only. The optic-nerve fibres enter in such a manner that the upper part of the anterior corpora contain only the uncrossed fibres. The posterior corpora contain the crossed fibres, which then enter the deeper portion of the anterior corpora. The crossed fibres are injured only when the destruction of the anterior corpora is very extensive. Electric irritation of the corpora quadrigemina produces various movements, which, however, the author does not consider as manifestations of the functions of the corpora quadrigemina. HIRSCHMANN.

*d.*—COLOR-PERCEPTION.

(The remainder of this report translated by Dr. C. ZIMMERMANN.)

560*a*. FONTAN. Un cas de Daltonisme traumatique. *Rec. d'ophth.*., Dec., 1883.

561. OTTOLENGHI. Il senso cromatico negli Israeliti. *Gazz. d. clin.*, 1883, vol. xix.

562. RIBEIRO DAS SANTOS. Chromatoscope. *Annal. d'ocul.*, 1883, November–December.

563. SHEFFLER. Die Theorie des Lichtes physikalisch und physiologisch mit specieller Begründung der Farbenblindheit. Leipzig, 1883, pp. 168, with three plates.

564. SEGGEL. Untersuchungen auf Farbenblindheit und Pupillardistanz. Festschrift, dem ärztlichen Verein München zur Feier seines fünfzigjährigen Jubilæmus gewidmet von seinen Mitgliedern. München, 1883.

FONTAN (560*a*) describes the following case of transient Daltonism, the consequence of an injury. A soldier received several injuries by an explosion: a wound at the right temple, 5 *mm.* long, with considerable hemorrhage from a branch of the temporal artery; a wound on the forehead above the right brow; two contusions of the occiput, and several minor injuries. The patient was unconscious for twenty-four hours. On the next day violent pain along the frontal nerves and the sup. and inf. maxillary nerves. R. S. = $\frac{1}{14}$; every object had a blue tint; field of vision contracted to a minimum. A superficial ophthalmoscopic examination revealed nothing abnormal. On the second day yellow was mistaken for red, very light yellow for blue. On the third day all colors appeared blue. On the fifth day the right eye recognized all colors, except the very light tints. Gradual healing of the wound, improvement of the general health, of vision, of the appreciation of colors, and of the visual field; at the end of the observation (one month) the external limit was 60°. On account of the dyschromatopsia and the contraction of the field of vision Fontan suggests a transient detachment of the retina, which might have escaped the ophthalmoscopical examination made only superficially in the first days, on account of general weakness.

MARCKWORT.

OTTOLENGHI (561) found twelve color-blind among 310 Hebrews of Turin and surroundings, examined with Holmgren's worsteds (3.87 %). Among them were three pairs of brothers, of whom two had a brother besides with normal vision; the third pair represented the only male offspring of a family, of which the mother's father had suffered from color-blindness. DANTONE.

RIBEIRO DAS SANTOS (562) has devised an apparatus for the examination of central scotoma with color-blindness. It consists of a rotating disc, bearing different small colored objects. The color required is adjusted for fixation by rotation of the disc.

SHEFFLER'S (563) theory forms the third supplementary part of the second volume of his natural laws. Sheffler bases the explanation of light upon his hypothesis on the quality of the ether and of matter. The theory of the appreciation of colors, based upon this hypothesis, rejects Hering's as well as Young-Helmholtz's theory. From physical and physiological reasons Sheffler's explanations appear very doubtful, but here it would lead us too far to discuss them more closely.

Some time ago Cohn, until then agreeing with Holmgren,

attacked Holmgren's method and accepted Stilling's. SEGGEL'S work (564) shows now how wrong Cohn was; just the contrary is the case. Holmgren's method is far superior to Stilling's in regard to quickness and accuracy. Not less than 228 soldiers, with very good appreciation of colors, could not read Stilling's tables, and 78 with partial color-blindness read them. Therefore, even the newest edition of Stilling's table appears very unreliable (according to Seggel). Seggel found a percentage of 5.81 for color-blindness. Out of 323 cases of color-blindness 102 were red-blind, and 104 green-blind, 117 incompletely color-blind. The pupillary distance has no relation to color-blindness, as Holmgren has shown before.

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## VI.—ERRORS OF REFRACTION AND ACCOMMODATION.

By Dr. HORSTMANN.

565. SZILI, A. The cone downward. *Centralbl. f. pract. Augenheilk.*, 1883, p. 358.

566. STORY, F. B. The estimation of refraction by rhinoscopy and after atropinization. *Ophth. Rev.*, vol. ii., 24, p. 294.

567. GOSETTI. L'astenopia sua patogenesi e cura. *Annal. di ottalm.*, vol. xii., 3 and 4.

The conus below the disc is always combined with simple or compound myopic astigmatism, according to SZILI (565). It is caused by a stretching of the lower half of the fundus, as it may be concluded from the ophthalmoscopic condition of the retinal vessels.

STORY (566) had the following results in testing the refraction before and after atropinization of thirty eyes: The refraction remained ten times unchanged, was diminished by 0.5 D. eleven times, by 1 D. three times, by 1.5 D. five times, and 2 D. once.

FITZGERALD.

GOSETTI (567) thinks that the nature of asthenopia is not sufficiently explained yet, as it frequently continues after correction of the optic errors of the eye, and is observed even in emmetropia with normal ranges of accommodation. DANTONE.

## VII.—LIDS AND SURROUNDINGS OF THE EYE.

568. KUHNT, H. On blepharoplasty by transplantation of large flaps of skin without pedicles. "Beitrage zur operativen Augenheilkunde," Jena, 1883 (G. Fischer), p. 1.

569. KUHNT, H. On the operative treatment of ectropium senile of the nasal half of the lower lid; canthoplasty with cutaneous flaps. *Ibid.*, p. 43.

570. ROBERTSON, ARGYLL. A new operation for ectropion. *Edinburgh Clinical and Pathological Journal*, Dec., 1883.

571. LEPLAT. De l'opération du ptosis congénital. *Annal. de la soc. méd.-chir. de Liège*, June, 1883.

572. STELLWAG VON CARION. A new method for inverted lashes. *Allgem. Wiener med. Zeitung*, 1883, No. 49.

573. MAGAWLY. Epithelioma of the lower lid. *Petersburger med. Wochenschrift*, 1883.

574. BRUNS, HENRY DICKSON. Three cases of leprous disease of the eye. *New Orleans Med. and Surg. Journ.*, vol. xi., No. 5, p. 351.

575. OSIO. Congenital coloboma of both upper lids. *El siglio medico*, May, 1883.

576. NICAISE. Pathogénie des kystes dermoides. Association pour l'avancement des sciences, xii. session, Rouen, 1883. *France méd.*, No. 31.

577. GALEZOWSKI et DAGUENET. Pommade contre les eczémas de la face. *Journ. de méd. et de chir. prat.*, 1883, p. 273.

578. PARISOTTI et LATTEUX. Epitheliome de la racine du nez. *Rec. d'ophth.*, 1883, No. 12, p. 689.

KUHNT (568) uses for blepharoplasty large flaps of skin without pedicles. After having carefully cleansed the bottom of the defect from every unevenness, and after stopping the hemorrhage, he covers it with lukewarm disinfected sponges, which cause a constant superficial hyperæmia of the capillaries, and preserve the normal temperature of the tissues. In severing the flap too much stretching and tearing has to be avoided. Then it is put into a lukewarm solution of sublimate, and is most radically cleansed from the adherent subcutaneous tissue. If the flap is very extensive, the central parts might be incised as drainage for the secretion. The flap has to be expanded without the least stretching, and has to be united with the margins of the neighboring cutis. Stitches are not necessary, perhaps even injurious. For the fixation of the marginal parts, the skin bordering the defect is undermined for 2 to 3 *mm.* from the wound edge, and the periphery of the flap is put under it. An antiseptic bandage covers the whole surface.

Ectropium senile of the nasal half of the lower lid is operated by KUHNT (569) as follows: In cases of normal skin and ciliary margin, with more or less relaxation and prolongation of the edge of the lid, a cuneiform piece of conjunctiva and tarsus is excised at the inner surface of the lid, with its base in the intermarginal tissue, its apex at the fornix of the lower lid. If the ectropium is combined with moderate retraction of skin, Arlt's tarsoraphia medialis has to be performed; in cases of more considerable retraction, blepharoplasty is indicated, according to Fricke's method, or by transplantation at isolated flaps.

A. ROBERTSON (570) uses for the operation of ectropion a thread, about fifteen inches long, bearing a needle on both ends. He pierces the lid with one needle on the outer surface, about one fourth of an inch from the middle, one line from the margin; then the needle pierces the fornix from the inner side in a downward direction, so that it reappears at the surface of the skin about one inch below the first puncture. The same is performed with the other needle, which finally comes out about one fourth of an inch from the contrapuncture of the first needle. A thin plate is put under both ligatures, lying upon the conjunctival surface, a small india-rubber tube under the loop, uniting the threads of the two first punctures, and the ligature is tied above it.

LEPLAT (571) reports a case of congenital ptosis of the right eye, operated upon successfully by Fuchs after Eversbusch's method (*cf. klin. Monatsbl. f. Augenheilk.*, March, 1883). The right palpebral fissure was only 5 *mm.* long (the left 11 *mm.*), and the patient could enlarge it to 7 *mm.* by an effort. The operation was performed exactly after Eversbusch, and the wound healed by first intention. The palpebral fissure was 3 *mm.* larger than before, some time after the operation. MARCKWORT.

STELLWAG VON CARION (572) removes the entire ciliary margin of the lid when the eyelashes are turned in. The flap thus obtained is put upon the surface of the wound in such a manner that the ciliary margin is turned away from the free edge of the lid, while the hairless margin of the flap coincides with it. It is always very easy to adapt the flap to the surface of the wound, and superfluous to fix it by stitches.

OSIO (575) observed coloboma of both upper lids in a child four months of age. At the right eye there were symblepharon and corneal abscess, and at the left atrophy of the globe from an inflam-

mation immediately after birth. Osio, on account of the symblepharon, considers, in this case, the coloboma as the consequence of an inflammation during the period of palpebral evolution, not as an interruption of development.

NICAISE (576) removed a dermoid cyst, the capsule of which exhibited only partly the structure of skin; the other portion was formed by a fibrous cellular membrane. MARCKWORT.

GALEZOWSKI and DAGUENET (577) recommend the following salve for facial eczema, accompanying frequently some eye-diseases in children: Olei cadini, o. 25; præcip. rubri, o. 1; camph., o. 25; vaselini, 10. o. MARCKWORT.

PARISOTTI and LATTEUX (578) describe a very hard tumor, observed by the patient six months previously, on the right side of the nose at the height of the inner canthus. During the operation only small connections with the deeper parts had to be severed. The tumor, about the size of a cherry-stone, consisted microscopically of epithelium partly calcified. These tumors are not malignant, and never return. They originate in the sebaceous glands. Three pictures of microscopical preparations of the tumor are added. MARCKWORT.

## VIII.—LACHRYMAL APPARATUS.

579. SIMI. La dacriocistite per la istillazione dell' infuso di jequirity nel sacco congiuntivale. *Boll., d'ocul.*, vol. iv., 4, 1883, pag. 53.

580. AMUNDSEN. Et corpus alienum i Taaresakken fjernet med Electro-magneten. *Hospitalstidende*, No. 52. Copenhagen, 1883.

SIMI (579) saw out of about 100 cases treated with jequirity, 3 times dacryocystitis, leading once to formation of fistula. DANTONE.

The point of a broken Weber's knife, located in the lachrymal sac, was successfully removed by AMUNDSEN (580) with an electro-magnet. SCHJÖTZ.

## IX.—MUSCLES AND NERVES.

581. WECKER, L. DE. Sur l'opération du strabisme au moyne de l'avancement capsulaire. *Rev. clin. d' ocul.*, 1883, No. 10.

WECKER (581) devises a new operation for strabismus, consisting of an advancement of Tenon's capsule, and thus of the insertion of the muscle into the capsule. MARCKWORT.

582. Bassi. Sulla vertigine oculare. *Sperimentale*, Nov., 1883.

In Bassi's (582) case violent vertigo occurred at any strong movement of the eyes, especially in looking upward, so that the patient was unable to work. Treatment with belladonna for two months cured the affection completely. Dantone.

## X.—ORBIT AND NEIGHBORING CAVITIES.

583. Weinlechner. Exostoses, parostoses, and odontomata. *Wiener med. Blätter*, 1883, Nos. 46–48.

584. Kundrat. Exostosis of the orbit. *Wiener med. Blätter*, 1883, No. 48.

585. Reymond. Linfomi voluminosi delle due orbite et al davanti delle due orecchie, con degenerazioni amiloidea dei soli elementi linfoidi. *Annal. di ottalm.*, vol. xii, 3 and 4, pag. 337.

586. Dieu. Documents relatifs à l'histoire des kystes hydatiques de l'orbite. *Rec. d'ophth.*, vol. iv, 12, p. 555

587. Glascott. Traumatic aneurism of left orbit, cured by compression of the carotid artery on the same side. *Ophth. Rev.*, vol. ii., July, 1883, p. 193.

588. Gauran. Anévrisme orbitaire double. *Gaz. des hôp.*, 1883, October.

589. Smith. Amaurosis from tumor in the nasal cavity, cured by removal of the tumor. *Ophth. Rev.*, vol ii., June, 1883, p. 167.

590. Russell, F. Exophthalmic goitre, *Ophth. Rec.*, vol. ii, No. 25, Dec., 1883, p. 317.

Weinlechner (583) operated upon an osteoma of the orbit, 24 *cm.* in periphery, dislocating the right globe and causing blindness of the right eye. The patient died of erysipelas. It originated in the diploë of the orbital roof. W. reports another case of an ivory tumor of the orbit in a girl, sixteen years of age, existing for one year. The osteoma, 12 *cm.* in periphery, was removed with good result.

Kundrat (584) observed an exostosis of the orbit. The tumor extended very far into the cranial cavity, therefore it could not be removed. The post-mortem examination showed that the tumor originated from the region of the lamina cribrosa and the superior inner angle of the orbital roof (probably from the frontal sinus. —H. K.)

Reymond (585) removed two lymphomata, of the size of an

almond, in a man, fifty-seven years of age, being located near the upper obital margin under the upper lid in both eyes. The microscopical examination revealed a partly-amyloid degeneration of the lymph elements, but not of the network and the fibrous fascicles. The patient had similar tumors in the parotis, the neck, the axilla, and the supra-clavicular region. DANTONE.

DIEU (586) compiled the literature on echinococci of the orbit and reports some clinical histories, partly in extenso, partly in abstracts. MARCKWORT.

GLASCOTT (587) describes an aneurysm caused by a heavy blow upon the region of the left eyebrow. After fifteen days the patient observed noises in his head, and after a few months protrusion of the left eye. The vision was diminished; the ophthalmoscopic examination showed an enlargement of the retinal veins. A murmur, synchronous with the cystole, could be heard at the supra-orbital arch. The treatment consisted of iodide of potass. internally, and of permanent compression of the left carotid. Meanwhile an intra-ocular hemorrhage and hyphæmia occurred. After three months neither protrusion nor murmur could be perceived. The patient could not see even light. Later on the protrusion of the globe disappeared, the lens became opaque, the pupil was wide and without reaction. (The lesion in this and the following case was most probably an arterio-venous communication in the cavernous sinus.—K.) FITZGERALD.

GAURAN (588) reports a case of an aneurysma of both orbits, caused by a fall upon the head, which healed spontaneously. MARCKWORT.

SMITH'S (589) case referred to a woman, twenty-five years of age, complaining of obstruction of the nose and pain in the forehead for several years. The vision of the left eye was gone. Sanguino-purulent secretion of the nose set in. The cause of the affection was a tumor in the nasal cavity. The tumor was removed as soon as the vision of the right eye deteriorated. Its sight improved again, but the left eye remained blind. Discoloration of the optic nerve and diminution in the calibre of the vessels were found on the examination with the ophthalmoscope.

RUSSELL (590) publishes five cases of morbus Basedowii. The first and the second case occurred in a brother and sister, and the third and the fourth in two sisters. Russell traces the disease back to a central basis. FITZGERALD.

XI.—CONJUNCTIVA, CORNEA, SCLERA, ANTERIOR CHAMBER.

591. Zweifel, P. Etiology of ophthalmo-blennorrhœa neonatorum. *Arch. f. Gynækol.*, vol. xxii., p. 329.

592. Hippel, A. v. On jequirity-ophthalmia. *V. Graefe's Arch. f. Ophthalm.*, vol. xxix., 4, p. 231.

593. Schmidt. On jequirity infusion against inveterate affections of the conjunctiva. *Wratsch*, 1883, No. 49–51.

594. Terrier. L'emploi du jequirity. Soc. de Chirurgie. *Progrès méd.*, 1883, No. 25.

595. Carré. Le jequirity. *Gaz. d'ophth.*, 1883, Dec.

596. Magni. Sul uso dell' infuso di jequirity. *Riv. clin.*, July, 1883.

597. Fortunati. Il jequirity nella terapia oculare. Naples, 1883.

598. Saint-Martin. Du traitement de certaines affections oculaires par la pommade à l'iodoforme. *Bulletin de la clinique nationale ophth. des Zuinze-Vingts*, 1883, April–June.

599. Camponière, Lucas. Lotions d'acide borique dans les conjunctivites rebelles. *Jour. de méd. et de chir. prat.*, 1883, June.

600. Reich. A diffuse yellow infiltration of the conjunctiva cured with iodoform. *Centralbl. für pract. Augenheilkunde*, Bd. vii., p. 321.

601. Schtschastny, A. J. On epidemic "tumefying catarrh" at the military hospital at Kiew. *Medicinsky Wjestnik*, Nos. 30–36.

602. Critchett and Juler. Papilloma of conjunctiva. *The Lancet*, 1883, No. 25.

603. Denti. Ulcero sifilitico primitivo della conjunctiva palpebrale. *Annal. di ottalm.*, vol. xii., p. 555.

604. Cuignet. Greffe conjonctivale. *Rec. d'ophth.*, vol. iv., 9, p. 497.

605. Kuhnt, H. Transplantation of a large unpedunculated flap into the conjunctival sac in order to prevent symblepharon. *Beiträge zur operativen Augenheilkunde*, Jena, 1883, Gustav Fischer, p. 33.

Zweifel (591) inoculated the normal lochial secretion upon the conjunctiva of the new-born in six cases, without producing blennorrhœa even once.

Hippel (592) prepared the maceration of jequirity from beans with the husks; the latter contain only an indifferent pigment, without any influence upon the conjunctiva. He used cold water in order to get a maceration as strong as possible. The effect is diminished by adding warm water. As the opinions about the doses of jequirity are very discrepant, and as Wecker has made different propositions, von Hippel constitutes a minimal dose, by means of which one succeeds in producing the characteristic ophthalmia in the normal conjunctiva of the rabbit, and the granulated conjunctiva of man. He tries to decide whether the intensity of the inflammation increases at the same rate as the concentration of the maceration. Brushing the conjunctiva of a rabbit five times with a one-fourth-per-cent. maceration, he observed a pretty violent inflammation with deposit on the conjunctiva and purulent infiltration of the cornea. The diseased human conjunctiva showed a reaction only in a very few cases upon a one-half-per-cent. solution. A two-per-cent. infusion gave the best results in the rabbit and in man. The intensity of the inflammation did not increase, but, on the contrary, decreased by a 5–7½–10-per-cent. infusion. The temperature of the room in which the maceration is prepared has no influence upon its effect, but the duration of the maceration is important for its intensity. It ranged from three to seventy-two hours. The inflammation reaches slower its acme by infusions macerated less than twelve hours than by the others. The freshness of the maceration is of essential influence; infusions of six to eight weeks produce a weaker inflammation than more recent infusions. By older ones only more or less conjunctivitis was produced. Hippel brushed the remedy into the conjunctival sac and had the following results: a violent inflammation occurred with intensive hyperæmia of the conjunctiva in recent granulations, but the granulations never disappeared. In cases in which the cornea was intact at the commencement of the jequirity treatment, relatively often affections of the cornea followed. The jequirity treatment is indicated in those inveterate forms of trachoma in which the conjunctiva is pale and extensively covered by hard, yellowish granulations reaching above the level of the mucous membrane. The intensive hyperæmia accompanying the ophthalmia and the serous infiltration of the lid are most favorable for the removal of the granulations. Coexisting pannus was decidedly cleared up.

The jequrity maceration was of excellent service in cases of old

trachoma with consecutive atrophy and retraction of the conjunctiva and pannus crassus of the cornea, in which until recently recourse was had to the doubtful means of inoculation. In several cases the cornea was considerably cleared up, without the characteristic symptoms of ophthalmia being very marked. In opposition to Sattler, Hippel does not consider jequirity-ophthalmia as an infectious disease. There is no stage of incubation which must precede an infectious disease. Through inoculation of secretion upon a healthy eye no ophthalmia could be produced; in some cases only a conjunctivitis could be observed with increased secretion. In every jequirity-maceration the bacillus, described by Sattler, can be found in great numbers; in other vegetable infusions, however, for instance in hay- or pea-infusions, a bacillus is found not different from the jequirity-bacillus in its reaction to aniline colors and in its form. Infusions in which the development of bacilli is entirely prevented, or in which the baccili and their spores are killed by effective means, produce the same ophthalmia, like the maceration containing bacilli. By virtue of these results, Hippel thinks that the action of jequirity is not due to the development of a specific bacillus, but that the beans contain an active chemical principle or an unformed ferment, producing the violent ophthalmia when brought in contact with the conjunctiva. Upon Hippel's request Gaethgens prepared an alcoholic extract, which had no effect; but, besides, an oily substance, obtained by maceration with ether, producing the characteristic symptoms of jequirity-ophthalmia in rabbits. Hippel however does not assert, from these two experiments, that the active principle of jequirity is found.

Schmidt (593) observed in 40 patients croupous inflammation of the conjunctiva produced by jequirity, which destroyed the trachomatous granulations. He never saw bad results.

Hirschmann.

Terrier (594) reports two cases in which jequirity was applied, in one with good, in the other without satisfactory, result. Terrier thinks that recent conjunctivitis granulosa can be cured by jequirity, but not inveterate cases.

Carré (595) discusses the results obtained with jequirity, compiling the different favorable and unfavorable opinions of authors.

Marckwort.

Magni (596) advocates jequirity; the result is most striking in the red and soft trachomatous granulations, as well on the con-

junctiva as on the pannus corneæ; the more atrophic the conjunctiva, the less the effect. DANTONE.

SAINT-MARTIN (598) saw in Fieuzal's clinic good results from iodoform ointment in ribbon-shaped keratitis, but not in conjunctivitis granulosa, blennorrhoica, pustulosa, and diffuse keratitis. MARCKWORT.

REICH (600) saw a diffuse yellow infiltration of the conjunctiva of the lower lid, of the semi-lunar fold, and of the caruncle disappear under treatment with iodoform. HIRSCHMANN.

KUHNT (605). In order to cure symblepharon after trachoma, the adhesion was first severed, then the conjunctival sac of the lower lid reëstablished by a large unpedunculated flap taken from the forearm. The transplanted flap of skin lost its character as cutis and assumed the appearance of mucous membrane in the case operated upon by Kuhnt.

606. MORANO. Degli effetti dell' eserina nella cheratite suppurativa. *Annal. di ottalm.*, vol. xii., 3 and 4, pag. 326.

607. RAMPOLDI, R. Dell' ulcera circinata della cornea. *Annal. di ottalm.*, vol. xii., 2, pag. 133.

608. HOLMER, AXEL. Ulcus corneæ serpens. Copenhagen, 1883.

609. TRÉLAT. Brulure de la cornée; staphylomes partiels, suivis de staphylome total; enucléation. *Gaz. des hôp.*, 1883, Sept. 17th.

609*a*. RAMPOLDI. Tre sorelle con buftalmo congenito. *Annal. di ottal.*, xii., 3 and 4.

610. KUHNT, H. On freshening and suturing the wound-edges in penetrating wounds of the cornea and sclera. "Contributions to Operative Eye-Surgery," Jena, 1883, Gustav Fischer, pag. 69.

611. RAMPOLDI. Dimonstrazione clinica della irrigazione linfatica sotto epiteliale anteriore della cornea umana. *Annali di ottalm.*, vol. xii., 5, p. 386; *Boll. d'ocul.*, vol. vi., 4, 1883, Dec.

612. KUHNT, H. Covering a traumatic defect of the sclera by splitting and displacing the edges. "Contributions to Operative Eye-Surgery," Jena, 1883, p. 87.

613. GASTALDO. Fibro-chondroma of the sclerotic. Avisos, 1883.

613*a*. RAMPOLDI. Un caso notevole di sclero-choroidite anteriore. *Ann. di ottalm.*, xii., p. 416.

MORANO (606) saw purulent keratitis caused by combustion with powder, terminating very favorably under treatment with eserine (in both eyes). DANTONE.

Rampoldi (607) describes as ulcus circinatum those multiple ulcers extending over larger segments of the corneal periphery, sometimes going into the depth of the membrane, and not seldom causing perforation. DANTONE.

HOLMER, A. (608) discusses the limitation and diagnosis of ulcus serpens corneæ, illustrating it by a number of clinical histories. Under etiology he considers the inoculations, done by others, and reports a series of similar experiments tried by himself. For inoculation, he used partly the viscous clear, partly the purulent, discharge from the lachrymal sac always with good result. The result was negative with discharge that had lain in a two-per-cent. solution of nitrate of silver for five minutes. The author recommends, in addition to Saemisch's operation, brushing in a two-per-cent. solution of nitrate of silver, as it was used with good result by Edw. Hansen Grut for the last few years.

SCHJÖTZ.

TRÉLAT (609) prefers enucleation to Critchett's operation in painful total staphylomata of the cornea and iris.

MARCKWORT.

RAMPOLDI (609*a*) reports that in a family of five children (one boy and four girls) three girls were born with buphthalmus and opacities of the cornea in both eyes.

According to KUHNT (610) the complicated injuries of the cornea, and of the cornea and sclera—*i. e.*, injuries of great extension, crooked and with uneven edges—require a thorough disinfection with sublimate after careful and sufficient abscission of the prolapsed iris. Then the edges of the cornea or sclera are freshened and united with sutures. Thus a favorable and quick healing of the wound is effected and deleterious cyclitis prevented. In this way Kuhnt succeeded in saving two cases from enucleation and preserving the shape of the globe and some vision. (The danger was greater than the gain.—H. K.)

RAMPOLDI (611) observed once more that remarkable symptom of a sudden opacity of the cornea from an inclined position of the head in a patient, aged twenty-five years, poorly nourished. The opacity was in the centre of the upper segment of the cornea, radiated toward the periphery, and disappeared on again raising

the head. Rampoldi considers the phenomenon to be caused by whitish lymph filling the lymphoid spaces. DANTONE.

GASTALDO (613) extirpated a fibro-chondroma, 6–7 *mm.* in diameter, 18–20 *mm.* in periphery, from the sclera at the outer canthus, 2 *mm.* distant from the corneal margin.

RAMPOLDI (613*a*) observed a homogeneous rarefaction and slight protrusion of the sclera around the whole cornea of the left eye of a strong healthy man, thirty-one years of age. The disease had developed in the course of twelve years, with frequent formation of phlyctænulæ. The irritation disappeared under proper treatment, but the blue ring remained. V was always $\frac{1}{4}$ (M = 4 D′). DANTONE.

## XII.—IRIS.

614. FUCHS, E. Irido-dialysis spontanea. *V. Graefe's Arch. f. Ophth.*, vol. xxi., 4, page 220.

615. MASSE, E. Pathogénie des kystes de l'iris ; leur production artificielle par des greffes de lambeaux de cornée sur la membrane iridienne. *Rev. clin. d'ocul.*, 1883, No. 1, page 17.

616. LITTLE, D. Sarcomatous tumor of iris. *The Lancet*, No. 11.

617. V. HASNER. Removal of the persistent pupillary membrane by corelysis. *Prager med. Wochenschr.*, 1883, Nos. 47 and 48.

618. GALLENGA. Dei metodi per accelerare la maturazione della cataratta e brevi cenni sulla corelisi del Foerster. *Giorn. d. R. Accad. di Med. di Torine*, 1883, fasc. 8, August.

FUCHS (614) saw spontaneous irido-dialysis in a globe enormously enlarged by sclerectasis, the membranes being very much rarefied. The circle of insertion of the iris became larger and larger in consequence of the sclerectasis, the iris being adherent to the cornea. The dialysis took place at the root of the iris, this being the most atrophic portion.

HASNER (617) succeeded in removing a pupillary membrane by an operation. The membrane had the shape of a yellowish plate, of the size of a poppy grain, from which a thread passed outward, dividing into six filaments in the pupillary area, all inserting themselves into the external boundary of the inner circle of the iris. After opening the anterior chamber, Hasner detached the plate adhering to the anterior capsule with a blunt hook. The course of healing was good, without any unfavorable consequences.

GALLENGA (618) reports that in the Turin clinic corelysis (after Foerster) was tried five times without any result, and thinks that the repeated paracentesis of the cornea is to be preferred.

DANTONE.

## XIII.—CHOROID.

619. MASSELON, J. Chorio-rétinite spécifique. Paris, 1883.

620. BORK, E. On uveitis anterior. *Allgemeine Wiener med. Zeitung*, 1883, Nos. 40–43.

621. KNAPP, H. Contribution to the clinical knowledge of metastatic irido-choroiditis. *Trans. Americ. Ophth. Soc.*, 1882.

622. BORK, E. Ophthalmoscopic condition in two cases of scars of the choroid after traumatic perforation of the wall of the globe. *Zehender's klin. Monatsbl. f. Augenheilk.*, vol. xxi., p. 417.

623. HAY, G. A case of extensive hemorrhage between choroid and sclera. *Trans. Americ. Ophth. Soc.*, 1882.

624. EPERON. Étude clinique sur la tuberculose primitive du tractus uvéal. *Arch. d'ophth.*, vol. xiii., 6, p. 485.

625. HIRSCHBERG, J., and BIRNBACHER, A. Epibulbar melano-sarcoma. *Centralbl. f. pract. Augenheilk.*, vol. vii., p. 327.

MASSELON (619) observed a number of cases of chorio-retinitis specifica for a long time, and published an account of their ophthalmoscopic conditions in a short monograph (sixteen pages). Twelve good photographs are added, illustrating very clearly the ophthalmoscopic images. The conditions observed at different times on the same eyes are very interesting, showing the different stages of chorio-retinitis. He classifies the conditions of chronic specific chorio-retinitis as pigmented, disseminated, atrophic, fibrous, and central, according to the arrangement of pigment, or atrophy, etc., prevailing in the ophthalmoscopic pictures. He adds, however, that these single forms are generally not entirely isolated, but may occur simultaneously in the same eye.

MARCKWORT.

BORK (620) describes as uveitis anterior a series of processes usually separated, as keratitis parenchymatosa or punctata and iritis, or irido-cyclitis. Among ninety-two such cases the affection of the uveal tract predominated thirty-two times over the corneal affection. The deposits on Descemet's membrane have to be considered as disturbances in the nutrition of the cornea.

KNAPP (621) observed a transient inflammation of the interior of one eye, and a purulent irido-choroiditis with destruction of the

globe of the other eye, in a young girl suffering from metritis contracted from a cold during menstruation. BURNETT.

HAY (623) saw, after spontaneous extensive ecchymoses of the ocular conjunctiva, detachment of the choroid, caused by a hemorrhage between the choroid and the sclera. BURNETT.

EPERON (624) distinguishes two forms of primitive tuberculosis of the anterior uveal portion. The one, commencing subsequently without pain, affects only children, and always terminates with loss of the eye. The second form, running a chronic course, is found in individuals somewhat older, and admits of improvement. In a boy, five years of age, otherwise healthy and without hereditary taint, iridocyclitis of the right eye occurred within a few days without pain, declining under treatment. Twenty days later the whole anterior chamber was full of pus, pointing at the corneal margin. The globe after enucleation showed thickening of the peripheric portions of the iris and the ciliary body from infiltration with tubercles, partly in cheesy degeneration, partly containing fresh giant-cells, and with round cells. A girl, seventeen years of age, with hereditary taint, swelling of glands and lupus of the face, showed the chronic form. Two months previously it had began with ciliary neuralgia. Intense ciliary injection, otherwise a picture of serous iritis, but with thickening of the tissue of the iris from infiltration in irregular foci. Landolt performed iridectomy in the right eye, where the process had further advanced, with considerable improvement. The author then discusses the clinical picture of both forms, the differential diagnosis of granuloma and gumma, and advocates enucleation in the acute form on account of the danger from generalization. The treatment of the chronic form is symptomatic and general. V. MITTELSTÄDT.

TREITEL describes a round-celled sarcoma, devoid of pigment, inserted with a small base into the upper, outer, posterior quadrant of the choroid, very soon extending over the retina, penetrating into the vitreous, and causing a sarcomatous degeneration of the entire intra-ocular portion of the optic nerve.

## XIV.—GLAUCOMA.

626. TARTUFFERI. Sull' anatomia patologica della cornea nel glaucoma. *Annal. di ottalm.*, p. 335.

627. JAKOBSON, sen. Clinical contributions to the knowledge of glaucoma. *V. Graefe's Archiv f. Ophth.*, vol. xxix., 3, p. 1.

628. MAUTHNER. On Prof. Jakobson's last essay on glaucoma. *Wiener med. Wochenshrift*, 1883, No. 47. (Polemical.)

629. MULES. Hereditary transmission of glaucoma. *Ophth. Rev.*, vol. ii., 1883, p. 49.

630. KIPP. A case of an acute attack of inflammatory glaucoma, immediately followed by meningitis. *Trans. Americ. Ophth. Soc.*, 1882.

631. BADAL. Traitement du glaucome par l'arrachement du nerf nasal externe. *Annal. d'ocul.*, 1883, vol. xc., p. 89.

632. CARRÉ. Du nouveau traitement du glaucome par l'arrachement du nerf nasal externe. *Gaz. d'ophth.*, 1884, No. 1.

633. MANZ. On hydrophthalmus congenitus. *Centralbl. f. pract. Augenheilk.*, vol. vii., p. 336.

MULES (629) reports a case of glaucoma in a father and his three sons. FITZGERALD.

BADAL (631) discusses the stretching of the infratrochlear nerve with tearing, previously recommended by him for glaucoma, an operation by which the tension of the eye is to be diminished. Badal opposes Abadie's opinion, to combine iridectomy or sclerotomy with the tearing of the infratrochlear nerve. In glaucoma fulminans, however, paracentesis must be combined with the above operation, which alone would act too slowly in this form of glaucoma. Communication of twenty-four cases.
MARCKWORT.

CARRÉ (632) discusses not unfavorably the stretching of the infratrochlear nerve with tearing, as recommended by Badal for glaucoma. No new observations. MARCKWORT.

MANZ (633) examined a case of hydrophthalmus congenitus in a relatively early stage of development. The posterior and anterior portions of the globe were enlarged, the supra-choroidal space enlarged, and the vitreous filled with partly aqueous fluid. No excavation of the optic nerve could be discovered ; the anterior chamber showed a considerable depth instead of a glaucomatous shallowness.

## XV.—SYMPATHETIC OPHTHALMIA.

634. DEUTSCHMANN, R. On experimental production of sympathetic ophthalmia. *V. Graefe's Arch. f. Ophth.*, vol. xxix., 4, pag. 274.

635. BENSON, A. Frequency of papillitis in sympathetic ophthalmitis. *Ophth. Rev.*, vol. ii, 1883, pag. 136.

636. NETTLESHIP, E. Sympathetic iritis after immediate excision. *The Lancet*, 1883, No. 25.

637. UHTHOFF. Rare condition of two ciliary nerves in irido-cyclitis traumatica with sympathetic irido-choroiditis of the second eye. *V. Graefe's Arch. f. Ophth.*, vol. xxix., 3.

DEUTSCHMANN (634) succeeded in producing sympathetic neuritis in a rabbit two years ago. He continued his experiments since, and found a method by which a real sympathetic ophthalmia, a typical inflammation of the uveal tract, is brought about. He injected spores of aspergillus in ¾ per cent. solution of chloride of sodium into the left eye of three rabbits, four times within twenty-four hours. In two animals the experiment was unsuccessful, but in the third one hyperæmia of the right disc could be observed in about seven or eight days after the first injection; this was soon followed by a marked inflammation. Eight days later the retina round the disc was slightly opaque; slight opacities of the vitreous appeared, and increased rapidly. Four weeks after the first injection of spores a series of prominent foci suddenly appeared in the choroid over the whole fundus. Deutschmann now interrupted his experiments. The rapidly advancing process made him fear that he would not obtain any useful microscopical preparations. After killing the animal he examined its eyes in combination with the optic nerves. The left eye, infected first, was destroyed by purulent irido-choroiditis. Pursuing the optic nerve upwards he found marked perineuritis and interstitial neuritis; the chiasma itself was but slightly infiltrated, but the pia, covering it, to a marked degree. The optic nerve descending from the chiasma toward the right sympathetically affected eye, at the beginning showed slight interstitial neuritis with enlargement of the circumvascular lymphatic spaces and slight infiltration of the sheath, gradually increasing and reaching its greatest intensity near the globe. This eye was affected by a marked papillo-retinitis. In the region of the optic nerve the choroid was much thickened, and consisted only of pus cells. Further forward there was a partial infiltration, extending to the ora serrata and corpus ciliare. Fibrinous coagula and pus cells in the vitreous. The ciliary nerves appeared normal in every respect.

BENSON (635) mentions the occurrence of neuro-retinitis or

papillitis in the eye sympathetically affected in a series of cases of sympathetic ophthalmia. Supported by this observation he thinks it probable that in most cases of sympathetic ophthalmia papillitis occurs, and that the tract of transmission lies in the optic nerve.

FITZGERALD.

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## XVI.—LENS.

By Prof. H. MAGNUS.

638. ABADIE. Moyens de combattre les accidents de suppuration consecutifs à l'opération de la cataracte. *Ann. d' ocul.*, 1883, September, October.

639. BERGER. Anatomical examinations of a case of osseous cataract. *Arch. f. Ophth.*, vol. xxix., 4.

640. DEUTSCHMANN. On nephritic cataract. *Arch. f. Ophth.*, vol. xxix., 3.

641. GALLENGA. Dei metodi per accelerare la maturazione della cateratta e brevi cenni sulla corelisi del Foerster. *Giorn. de R. Accad. di Med. di Torino*, fasc. 8, 1883.

642. HIRSCHBERG. Anatomical and practical remarks on cataract operations. *Berliner klin. Wochenschr.*, 1883, No. 3.

643. DE LAPERSONNE. Étude clinique sur la maturation artificielle de la cataracte. *Thèse de Paris*, 1883.

644. MAUTHNER Phlébotomie après l'opération de la cataracte. *France méd.*, 1883. He recommends bleeding for suppuration of the cornea after cataract operation. (What has *not* been recommended for suppuration of the cornea?—H. K.)

645. NOYES. On Foerster's operation for maturing cataracts. *Med. Record*, 1883, August 4. The method was tried eight times; the time of ripening was between four days and five months; in three cases iritis followed the operation.

645*a*. SECONDI. Sulla medicazione antisettica nelle operazioni di cataratta. *Italia medica*, 1883. No. 48.

646. PFLÜGER. Hemorrhage into Petit's canal. *Berliner klin. Wochenschr.*, 1883, No. 42.

647. SCHERK. Iridotomy and discision. *Klinische Monatsblätter f. Augenheilk.*, vol. xxi., p. 315.

648. WARLOMONT. De l'hémorrhagie consécutive à l'extraction de la cataracte. *Annal. d'ocul.*, 1883, July–August.

649. BARDE. Rapport pour 1881 et 1882 sur l'hôpital ophthalmique à Genève.

ABADIE (638) adopts the following practice in case of infection of the wound after cataract operation, when suppuration is sure to follow. The centre and the two angles of the wound are cauterized with the galvano-cautery, and the anterior chamber is somewhat opened with Weber's knife, so that the aqueous escapes. Then the eye is covered with borated lint, and cleansed every three or four hours with a saturated solution of boracic acid. The cauterization of the wound is at first repeated every twelve hours; after the second day, however, every twenty-four hours, until the danger of suppuration is over. (How many eyes have been saved been saved by this treatment?—H. K.)

MARCKWORT.

BARDE (649) reports on the ophthalmic institution in Geneva founded by Rothschild, of which he is the surgeon in charge. He used Foerster's method of ripening cataract for several years, but does not consider it safe. He recommends extraction within the capsule. MARCKWORT.

The artificial ripening of cataract may be produced after GALLENGA (641) by the old method of incision of the capsule, or by rubbing according to Foerster. From observations of twenty operations after the first method, and five after the second, the author concludes that both answer the purpose, but have different indications. The three incisions of the capsule with the needle, which converge toward the puncture in the cornea, and ought to be 1 or 1½ *mm.* long, cause a rapid opacity of the transparent lens portions, so that the extraction may be performed after five days. This method is to be especially recommended in zonular and posterior polar cataracts. Foerster's method—*i. e.*, massage of the capsule after preliminary iridectomy—causes less irritation and a slower development of the desired opacity; it is indicated in senile cataracts with sclerosed nuclei.

DANTONE.

LAPERSONNE (643) compiled, from different clinics, cases operated on for artificial cataract-ripening, after different methods. Lapersonne considers Foerster's method as very promising and almost innocuous. MARCKWORT.

SECONDI (645*a*) makes his extractions under spray of carbolic acid, and dresses strictly antiseptically after dusting the section and the conjunctival sac, especially at the lacus lacrymalis, with impalpable iodoform powder. In sixty cases thus treated not one failure occurred. DANTONE.

WARLOMONT (648) reports the case of a patient who lost both eyes from intra-ocular hemorrhage after cataract operation. The left eye was operated on by Warlomont (a small flap downward and iridectomy); the right eye was operated by Lebrun three months later (a small median flap without iridectomy).

MARCKWORT.

## XVII.—VITREOUS BODY.

By Prof. H. MAGNUS.

650. HERSING. On persistent hyaloid artery. Fifty-sixth meeting of German naturalists and physicians. *Centralbl. f. pract. Augenheilk.*, 1883, p. 336.

651. VASSAUX. Persistance de l'artère hyaloidienne et de la membrane pupillaire, ayant determiné des altérations intra-oculaires simulant cliniquement un néoplasme. *Arch. d' ophth.*, vol. iii., 6.

HERSING (650) gives the following description: In the right eye of a girl, aged eleven years, with very poor vision, there is an intensely white disc-shaped deposit of 3 *mm.* on the posterior capsule. A floating cone is connected with it, slightly striated, appearing red on oblique illumination, grayish-white by transparent light. The circumference of this cone increases to the size of a small pea. It then diminishes slightly, and can, by transmitted light, be traced to the optic disc. A grayish-white substance rises from the outer side of the disc with processes, one to three diameters of the disc in length, passing upward, inward, and outward. These processes are folds of the retina, uniting to form a cord which extends forward and adheres to the posterior capsule. Hersing thinks that this condition is due to a fœtal inflammation. The sheath of the hyaloid artery adheres to the retina and the posterior pole of the lens in consequence of an inflammation during fœtal life.

VASSAUX'S (651) very interesting observation (at Panas' Clinic) was made on a child, fifty-four days of age. Soon after birth a whitish reflex from the pupil of the left eye was noticed. All characteristic symptoms of an intra-ocular tumor covering the posterior surface of the lens and showing many blood-vessels were present. Posterior synechiæ, lens somewhat opaque, fundus nowhere normal. Enucleation.

The following conditions had led to the mistaken diagnosis of

glioma : the posterior surface of the opaque and flattened lens is covered by a biconvex disc, consisting mostly of capillary vessels and interstitial fibrous tissue in its anterior portions, extending through a gap at the posterior pole into the capsule. The posterior portion of this pseudo-membrane is devoid of vessels and united with the ciliary processes, which are very much stretched and thinned, masking its posterior surface, excepting a central portion, 3.5 *mm.* broad, from which the hyaloid artery emerges, and then passes through the vitreous to the optic disc, surrounded by a tender sheath lined with a kind of epithelium. At the lamina cribrosa it coalesces with the adventitia. Broad synechiæ of the iris with the capsule, and slender anterior synechiæ with traces of a pupillary membrane at the pupillary margin. Retina not detached. Choroid almost normal. Vitreous slightly opaque. The author suggests an inflammation within the ramifications of the hyaloid artery, leading to iridocylitis, exclusion of the lens and swelling of its fibres, rupture of the capsule and zonula. The supposed hyaloid canal is only the sheath of the hyaloid artery. Microscopic conditions are given in detail. V. MITTELSTÄDT.

## XVIII.—RETINA, OPTIC-NERVE, AND FUNCTIONAL DISTURBANCES.

### By Dr. HORSTMANN.

652. DE LUCA. Considerazioni sullo scollamento disseminato della retina. *Annal. di ottalm.*, vol. xii., 3 and 4, p. 330.

653. GALEZOWSKI. Des différentes variétés des decollements de la rétine et de leur traitement. *Rec. d'ophth.*, 1883, No. 11, p. 669, and No. 12, p. 694.

654. QUAGLINO. Intorno alla retinite pigmentosa. *Annal. di ottalm.*, vol. xii., 5, p. 372.

655. RAMPOLDI. Retinite pigmentosa in quattro fratelli pellagrosi. *Annal. di ottalm.*, vol. xii., 3 and 4, p. 268.

656. DOR, H. Héméralopie dépendante d'une forme atypique de rétinite. *Arch. d'ophth.*, vol. iii., No. 6, p. 487.

657. SCHNABEL. To the symptomatology of retinitis albuminurica. "Report of the Innsbrucker naturwissenschaftl. med. Verein," vol. xiii., 1883.

658. MOORE, W. O. Retinitis albuminurica during pregnancy ; stillbirth with improvement of sight. *The Planet*, 1883, July 15th.

659. MERRILL, C. S. Glioma retinæ in a patient twenty years of age. *Trans. Amer. Ophth. Soc.*, 1882.

660. MEISSENBACH, A. H. Gliosarcoma. *St. Louis Med. and Surg. Jour.*, April, 1883.

DE LUCA (652) asserts that a diffuse accumulation of serous exudation between retina and choroid precedes the detachment of the retina, the exudation gradually collecting and causing the detachment. This disseminated detachment, so called by the author, causes dimness of sight, and the retina looks like hazy window-glass (?). The author uses pilocarpine for this first stage; for the detachment proper he punctures the sclera between the insertions of the external and inferior recti, or cauterizes the sclera in its lower segment. DANTONE.

GALEZOWSKI (653) tries to prove that detachment of the retina can only be brought about under two conditions: 1, synchysis of the vitreous; 2, a partial circumscribed serous inflammation of the anterior portion of the choroid and especially of the ciliary ring. In order to refute Leber's opinion, that perforation of the detached retina is closely connected with the origin of the disease, Galezowski mentions that he saw only 131 perforations among 649 detachments of the retina. MARCKWORT.

QUAGLINO (654) found syphilis the cause of retinitis pigmentosa six times in fourteen cases. DANTONE.

RAMPOLDI (655) saw four brothers suffering from pellagra and a high degree of retinitis pigmentosa. The mother of the patients had died with pellagra; an uncle and a cousin of them became insane from the same cause. DANTONE.

DOR (656) observed in a peasant, twenty-one years of age, who consulted him in order to get a certificate freeing him from military service, hemeralopia commencing in his fourth year after variola. There is no other eye-disease in the family except in a sister, who also became hemeralopic after variola. S = $\frac{20}{30}$, decreases to $\frac{20}{100}$ by a diminution of illumination not affecting V of a normal eye. Reading by gaslight is interrupted by the least turning down of the gas. Field of vision very much limited when the candle is two metres distant from the campimeter; it enlarges when the candle is held nearer, and becomes normal by daylight. Ophthalmoscope: "A grayish-white hue over the whole fundus to the equator, like the tapetum of some animals. Vessels and disc normal. Dor thinks thinks that the changes are situated in the

pigment layer, and that the layer of rods is intact, because neither amblyopia nor scotomata are present. Dor emphasizes the importance of the examination of the visual field by weak illumination. V. MITTELSTÄDT.

SCHNABEL (657) on the strength of four cases rejects the supposition that retinitis albuminurica is not accompanied by disturbance of appreciation of color. In all, the retinal centre was unable to recognize blue and yellow; whereas green and red were distinctly perceived.

MOORE (658) observed in a woman, forty-eight years of age, blindness from retinitis albuminurica, one month before the normal end of pregnancy. Premature labor was induced. There was an immediate improvement. After four months the patient was able to resume her work. The fœtus had apparently died several days before delivery. BURNETT.

MERRILL (659) communicates a case of glioma in a patient, twenty-one years of age. The microscopical examination revealed that the tumor consisted almost entirely of small round cells. It was surrounded by more or less large remnants of retinal elements. The optic nerve appeared free from cellular infiltration.

BURNETT.

MEISSENBACH (660) reports a glioma in a child three years of age. The eye was not removed until the tumor had pierced the sclerotic and extended to the orbital tissue. Death occurred one and a half months after removal of the tumor, in consequence of metastasis to the brain and other parts of the body.

BURNETT.

661. RAMPOLDI. Amaurosi da atrofia ottica in quattro generazioni. *Annal. di ottalm.*, vol. xii., 3, p. 268.

662. RAMPOLDI. Osserv. di atrofia progressiva dei nervi ottici. *Annal. di ottalm.*, vol. xii., 5, p. 416.

663. NETTLESHIP, E. Optic neuritis followed by dropping from the nostril. *Ophth. Rev.*, vol. ii., 1883, p. 1, Jan.

664. SMITH, PRIESTLEY. Persistent dropping of fluid from the nostril, associated with atrophy of the optic nerve and other brain symptoms. *Ophth. Rev.*, vol. ii., p. 4, 1883, Jan.

665. MORRIS. Hereditary atrophy of the optic nerve. *Trans. Amer. Ophth. Soc.*, 1882.

666. SMITH, PRIESTLEY. Blood in sheath of optic nerve. *The Lancet*, 1883, No. 52.

667. PEUNOW. Aneurysma arteriæ centralis retinæ. *Wladiskowkas*, 1883, No. 37.

A patient of RAMPOLDI's (661), suffering from white atrophy of the optic nerve, states that his father and his grandmother became blind from "gotta serena" at thirty-five years of age, and that the same happened to his aunt, cousin and the cousin's son, and a female cousin, but in more advanced years. DANTONE.

RAMPOLDI (662) reports over three cases of white atrophy of the optic nerve in individuals in whose families lunacy and apoplexies of the brain frequently occurred. DANTONE.

NETTLESHIP (663) observed that the sight, especially of the left eye, deteriorated in a woman who had suffered from nervous symptoms. The optic nerve showed atrophy after papillitis. The field of vision was contracted toward the centre in both eyes. The patient stated that about two months ago she suffered from dropping of clear fluid from the nostril, so that she had to use a dozen of handkerchiefs daily. The chemical analysis proved that the fluid did not come from the nasal cavity. After a year the dropping was less. FITZGERALD.

SMITH (664) also observed two cases of atrophy of the optic nerve, complicated with dropping from the nostril. In one case it lasted four years, in the other two and a half years, before the appearance of visual disturbances. At the same time both patients suffered from violent headache and other nervous symptoms. Smith thinks that an affection of the bone in the region of the lamina cribrosa produced a meningitis, causing the atrophy of the optic nerve. FITZGERALD.

MORRIS (665) describes two cases of atrophy of the optic nerve. The patients were first cousins (their mothers being sisters). There was apparently a hereditary transmission of the same affection over four generations, commencing with the grandfather of the mother. It seemed to be transmitted through the female members and began usually between the ages of twenty-five to forty years. BURNETT.

PEUNOW (667) saw an aneurysma arteriæ centralis retinæ. V R $= \frac{5}{40}$. V L $= \frac{5}{30}$. The ophthalmoscope revealed in both eyes aneurysmata up to the size of a hemp-seed on enlarged arterial branches—in the right nine, in the left seven. The peripheric were larger than the central. Pulsation was noticeable in all; on pressure upon the carotid they became smaller in the corresponding ye, and the peripheric ones collapsed entirely. HIRSCHMANN.

## XIX.—INJURIES, FOREIGN BODIES, PARASITES.

By Prof. H. MAGNUS.

668. Denti. Contribuzione allo studio dell'amblyopia ed amaurosi traumatica. *Ann. d'ottalm.*, vol xii., 5.

669. Fraenkel. Removal of a piece of iron from the vitreous by means of a scleral section and the electro-magnet. *Deutsche med. Wochenschr.*, 1883, No. 46.

670. Mengin. Observations cliniques. *Rec. d'ophth.*, 1883, September.

671. Page, Olaf. A case of traumatic amaurosis. The electio-magnet for extraction of foreign bodies from the eye. *Med. News*, 1883, August 18th and Sept. 22d.

672. Purtscher. A case of affection of the eye by a thunderstroke. *Arch. f. Ophth.*, vol. xxix., 4.

673. Reich. Interesting diseases of the eye. *Wratsch*, Nos. 45 and 46.

674. Snell. Retinitis caused by a flash from a sun reflector. *Ophth. Review*, 1883, vol. ii., p. 141.

675. Thomson. Case of fracture of the skull in which conjugate deviation of the eyes, which had existed for four months, was removed by trephining. *Brain*, 1883, p. 99.

676. Trost, W. A. Pulsating exophthalmus of both orbits. *Ophth. Soc. of the Unit. King.*, 1883, March.

Denti (668) reports four cases of complete blindness without any ophthalmoscopic changes after injuries of the eye. In one of these patients the sight was perfectly restored after a few months, in the others atrophy of the optic nerve ensued. The author considers an injury to the optic nerve between foramen opticum and the entrance of the central retinal artery into the nerve as the cause of these affections. In four other cases the eye was not directly injured, but the neighboring bones. In these cases Denti supposes that the first traumatic injury to the nerve took place in the foramen opticum or at the base of the cranium in front of the chiasma. The atrophy commenced there, and became visible with the ophthalmoscope when it reached the optic disc. Dantone.

Mengin (670) noticed in a patient (1) chronic glaucoma with gradual loss of sight in the left eye thirty years after an injury to the right. After enucleation of the injured eye, the glaucomatous

process in the other eye not only was arrested, but even the sight and the field of vision improved. (2) Mengin had to perform enucleation four years after neurotomy, which had a very good result for three and a half years. (3) A rupture of the globe upward and inward, with dislocation of the lens and iris under the conjunctiva, occurred in a woman from a hurt with a pitchfork. On oblique illumination nothing of the lens or iris could be seen in their normal places. No hemorrhage in the interior. Media clear. S: $\frac{3}{10}$ with + 11 D. MARCKWORT.

PAGE (671) describes the following cases: (1) A man fell violently upon his face and forehead above the left eye. On the fourth morning after the accident he awoke with entire loss of sight and swelling of the lids. When the swelling of the lids had disappeared (five months after the injury), the ophthalmoscopic examination revealed complete atrophy of the optic disc. Not a single vessel could be discovered on it. (2) A clean section of the sclera and the lower third of the corneal margin. The magnet, connected with a Stöhrer battery of twenty elements, was applied to the wound. A tick was heard, but the foreign body could not pass the wound. A pair of iris-forceps was introduced, the magnet remaining in position; the piece of iron was seized and extracted. It weighed eight grains. The condition of the eye is not described in detail.

REICH (673) describes (1) scotoma centrale in consequence of an observation of a solar eclipse; after a year a dark coloration of the region of the yellow spot. (2) Combustion of the cornea by a hot smoothing-iron; white scab; the next day perfect recovery. (3) Hemorrhage in the region of the yellow spot in consequence of great straining; constant current; after six weeks, recovery, but a small defect downward from the point of fixation. (4) Peculiar, yellowish-gray, chronic inflammatory, obstinate infiltration of the conjunctiva; quick healing with iodoform put into the eye (salve, powder).

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## XX.—AFFECTIONS OF THE EYE IN GENERAL DISEASES.

By Dr. HORSTMANN.

677. HERSCHEL. On hemianopsia nasalis. *Deutsche med. Wochenschr.*, 1883, No. 16.

678. ARMAIGNAC, H. Aphasie complète, hémiplégie et hémiopie droites, agraphie pendant six mois. Guérison de la paralysie;

retour de la parole ; persistance de l'hémiopie, de l'agraphie, et de la cécité des mots. *Rev. clin. d'ocul.*, vol. iv., 6, p. 97 ; *Rec. d'ophth.*, vol. iv., 11, p. 625.

679. NIEDEN, A. A case of unilateral temporal hemianopsia of the right eye after trepanation of the left occipital bone. *V. Graefe's Arch. f. Ophth.*, vol. xxix., 3. p. 143.

680. CHARCOT. Cécité verbale. Hémiopie. *Gaz. des hôp.*, 1883, May.

681. WILLIAMS, A. D. Temporal hemiopia. *St. Louis Med. and Surg. Journ.*, 1883, March.

682. GOWERS, W. R. Memoranda on eye-symptoms in spinal disease. *Ophth. Rev.*, 1883, No. 18, p. 123 ; *Med. Times and Gaz.*, No. 1720.

683. JACKSON, HUGHLINGS. Eye-symptoms in spinal disease. *The Lancet*, 1883, No. 24.

684. WERNICKE, C. Amaurosis with preserved reaction of the pupil in a case of tumor of the brain. *Zeitschr. f. klin. Med.*, vol. vi., p. 321.

685. BULL. Two cases of ophthalmoplegia externa associated with disease of the optic nerves from brain tumor, with autopsy. *New York Med. Journ.*, 1883, August.

686. MUSSO. Sulle irregolarità dell'orificio pupillare negli alienati. *Sperimentale*, 1883, December.

687. LANDESBERG. On sinus-thrombosis. *Centrabl. pract. Augenheilk.*, vol. vii., p. 332.

688. COUNDOURIS. Le diabète dans ses rapports avec les lésions des membranes de l'œil. *Thèse de Paris*, 1883.

689. BRUNS. H. DICKSON. Retinal hemorrhage in malarial toxæmia. *New Orleans Med. and Surg. Jour.*, vol. xi, No. 6.

690. PEUNOW. Affections of the eye caused by malarial fever. *Wladiskowkas*, 1883, No. 37.

691. GALEZOWSKI. Des troubles visuels consécutifs à l'abus du tabac. *Rec. d'ophth.*, 1883, Nov.

692. MASSELON. Diagnostic de l'amblyopie nicotinique. *Rev. clin. d'ocul.*, 1883, No. 10.

693. BUZZARD. On two cases of tobacco amblyopia. *The Lancet*, 1883, No. 2.

694. WEBSTER, D. A case of central scotoma. *N. Y. Med. Record*, 1883, June 9.

695. Derby, R. H. A case of anæsthesia of the retina with consecutive contraction of the field of vision. Recovery by inhalation of nitrite of amyl. *Trans. Amer. Ophth. Soc.*, 1882.

Herschel (677) describes a case of nasal hemiopia in consequence of apoplexy.

Nieden's (679) case was a young girl, who received a fissure of the skull by a heavy fall upon the occiput, so that trepanation of the left portion of the occipital bone had to be performed. At the beginning, typical hemiopia of the right eye was present, the consequence of an injury to the left visual centre.

Armaignac (678) publishes a second case of "word-blindness." A man, 66 years of age, was attacked at night by right-sided hemiplegia and hemiopia with aphasia and agraphia. Whilst the hemiplegia gradually subsided in four months, and the aphasia stopped suddenly after six months, hemiopia and word-blindness exist even now (after four years). The patient learned gradually to write his name mechanically, without knowing the single letters of it. He now speaks French and Spanish as well as formerly, but signs his name exactly like a child learning to write ; he mistakes "r" for all letters of the alphabet. The patient never forgot the numbers. Frequently he fails to recall the names of objects ; he recognizes colors quite well, but sometimes he cannot remember their names. From the given history the author concludes that the motor centre for the right arm and leg, the centres of articulated speech, memory for words, and for the vision of the right half of the visual field cannot be located far one from another. Marckwort.

Charcot (680) reports two interesting cases of "cécité verbale." One of the patients was seized with apoplexy. After improvement of a right-sided hemiplegia and aphasia, lasting for a short time, the patient observed that he could not read any more, but he could write. He understood perfectly what was spoken, could write correctly, but was almost absolutely unable to read. Hemiopia on left side. After two months, improvement of the hemiopia and inability to read. Marckwort.

Bull (685) reports two cases of ophthalmoplegia externa. 1. A man, thirty-four years of age. Urine normal. Intense headache for fourteen months. Moderate exophthalmus and almost complete immobility of the left eye. Limited mobility of the right eye inward. Both pupils enlarged and sluggish. Upper

lids retracted. Papillitis marked in the left eye, incipient in the right. Death. The post-mortem examination showed a cystic mass, the size of a walnut, on the right side of the third ventricle. It originated in the anterior portion and the plexus chorioideus, with which it was connected. The chiasma was compressed, and both optic tracts were flattened. 2. A man, thirty-three years of age. Complete paralysis of both oculomotor and abducent nerves. Ptosis. Slight exophthalmus. Temporal side of the optic disc œdematous. Post mortem: tumor of the size of a pigeon's egg in the centre of the middle central lobe. Optic tracts slightly flattened, and the third and fourth nerves compressed.

BURNETT.

According to MUSSO's (686) investigations the pupils of forty per cent. of the insane are markedly oval or imperfectly round. In the sane this abnormity is found in only ten per cent. The observations were made on 300 lunatics and 100 sane persons.

DANTONE.

PEUNOW (690) mentions four cases of eye-disease from malaria. 1. Long-continued febris intermittens tertiana; diffuse haziness of the vitreous; numerous hemorrhages into the retina of different form and age. 2. Lateral hemiopia with mistakes in the appreciation of colors in both eyes, lasting for a few days, after each paroxysm of a violent intermittens. 3. Irregular fever-paroxysms. After them, diminution of sight and inability to distinguish any color except red. Healing simultaneous with disappearance of the fever under quinine. 4. Febris intermittens tertiana; after each paroxysm loss of appreciation of color, continuing for twelve hours. Reaction of pupils sluggish; ciliary and orbital pains; $V = \frac{5}{15}$. Episcleral injection. When the fever ceased, all ocular symptoms disappeared. HIRSCHMANN.

GALEZOWSKI (691) saw out of 18,021 eye-patients 151 cases of amblyopia from abuse of tobacco and alcohol, the majority suffering from both intoxications and only 21 from mere tobacco amblyopia. After discussing the symptoms and the course of this disease Galezowski says about the etiology: in persons indulging in alcohol and possessing certain idiosyncrasies, the tobacco, even in small quantities, may produce disturbances of sight. To relieve these symptoms, not only is the use of tobacco to be entirely given up, but rooms in which smoking is indulged must be avoided. Breathing for some time an atmosphere containing tobacco may be dangerous to the general health and to the sight. MARCKWORT.

MASSELON (692) discusses the alcohol and tobacco amblyopia, and says in regard to the etiology, that this amblyopia is the consequence of the use of tobacco, not of the alcohol. Masselon mentions that, except the well-known color scotomata, in nicotine amblyopia a scotoma for white is found, occupying a place in the upper half of the visual field. A small white object, when moved in the visual field, is not always seen by the patient with the same distinctness, but in certain points it is surrounded by a gray, yellow, or reddish mist. These points extend from the limits of the field of vision over a greater or smaller portion of the upper half of the visual field. Discussing the examination for central color scotomata, Masselon mentions an instrument, constructed by Crétès in Paris after Ribero Santos de Bahia's device. Santos was led to it by a mode of examination practised for a long time in de Wecker's clinic: A color passes so quick the centre of the field of vision, that the patient has no time to adjust the peripheric portion of his visual field, in which he recognizes the colors better. The instrument consists of a disc with a handle of the size of an ophthalmoscope, and an aperture, 12 *mm.* large, near the upper margin. Behind this opening a color on a movable disc is quickly rotated, whilst the patient fixes the hole at 25 *cm.* distance and names the color recognized by him. The examiner observes the hole at the back of the instrument, which has the same arrangement as the front, and so verifies the patient's statements. (A similar instrument can be very easily constructed by sticking small pieces of colored paper at the septa between the stenopæic holes of the movable disc of the stenopæic lorgnette.—REV.) MARCKWORT.

DERBY (695) observed the case of a girl, aged eight years, recovering from scarlet-fever, who showed a contraction of the visual field to 10°. The discs had lost their capillary red. The normal field was restored after several inhalations of nitrite of amyl. BURNETT.

## MISCELLANEOUS NOTES.

Dr. ERNEST FUCHS, Professor of Ophthalmology in the University of Liège, Belgium, has received the first prize ($400) awarded by the English Society for the Prevention of Blindness and the Amelioration of the Condition of the Blind to the best treatise on "The Prevention of Blindness."

The second prize, $200, was awarded to Dr. HERMANN WILBRAND, of Hamburg, Germany; the third to Mr. J. P. MULES, of Manchester, England.

The work of Dr. H. MAGNUS, of Breslau, "The Causes and Prophylaxis of Blindness," which had appeared just before the publication of the prize question, could not participate in the *concours*, but received the unqualified appreciation of the committee on the prize essays.

Dr. CHARLES H. WILLIAMS has been appointed Instructor in Ophthalmology in the Medical School of Harvard University.

Dr. W. O. Moore, Professor of Eye and Ear Diseases at the N. Y. Post-Graduate Medical School and Hospital, has been appointed Professor of Diseases of the Eye and Ear at the Medical Department of the University of Vermont, in place of Dr. D. B. St. John Roosa, who has resigned.

Our collaborator, H. Lindo Ferguson, F.R.C.S.I., late of Dublin, has recently settled in Dunedin, N. Z., and has been appointed Ophthalmic Surgeon to the Dunedin Hospital.

Four **text-books** have appeared since our last issue—two English, of which we have seen the American "editions" only, and two in German.

(1) HENRY E. JULER, F.R.C.S. "A Hand-Book of Ophthalmic Science and Practice." Phila.: H. C. Lea's Son & Co., 1884, 467 pp., large 8vo. This treatise is well written, concise, and to the point, and beautifully gotten up. It contains, in the text, 125 wood-engravings, and twenty-six chromo-lithographic plates to illustrate inflammatory diseases of the eye, but chiefly ophthal-

moscopic and some microscopic conditions. The illustrations are very well executed. The book can be highly recommended to students and practitioners of medicine; the ophthalmic specialist also will read it with pleasure and profit. Price, $4.50.

(2) HENRY R. SWANZY, A.M., M.B., F.R.C.S.I. "A Hand-Book of the Diseases of the Eye and their Treatment." New York: D. Appleton & Co., 1884, 437 pp., small 8vo. The "get up" is less splendid than in the previous book, but the presentation of the subject is very good. Price, $3.00.

(3) JULIUS MICHEL, Prof., University of Würzburg. "Lehrbuch der Augenheilkunde." Wiesbaden: J. F. Bergmann. 674 pp.; large 8vo. Price, 18 Mark.

(4) HERMANN SCHMIDT-RIMPLER, Prof., Univ. Marburg. "Augenheilkunde u. Ophthalmoscopie." Braunschweig: Fr. Wreden, 1885. Price, 14 Mark.

Both books are well written, with a good deal of originality and critical judgment. The relations of ophthalmic to general diseases is a prominent feature, especially in Michel's book.

Besides these new books, we take pleasure in noticing, as excellent material:

(1) The continuation of the "Traité complet d'ophthalmologie," by L. DE WECKER and E. LANDOLT. Paris: Lecrosnier. Tome ii., deux. fasc., "Maladies du tractus uvéal, du corps vitré, de la sclérotique; glaucome," par de Wecker. Tome iii.; deux. fasc., "Refraction et accommodation (partie clinique)," par E. Landolt.

(2) The fourth volume of "The Trans. of the Ophthalmological Soc. of the United Kingdom." 376 pages. London: Churchill.

(3) A monograph of 142 pages, with four lithographic plates, "Zur Lehre vom Glaucom," by Prof. FERD. ARLT, Vienna. Vienna: Braumüller, 1884.

(4) The chapter on "Injuries and Diseases of the Eyes and their Appendages," by E. WILLIANS, M.D., Cincinnati, in "The International Encyclopædia of Surgery" (J. Ashhurst). Vol. v., pp. 170–288, with wood-engravings and two colored plates. New York: W. Wood & Co. 1885.

## ERRATA.

At bottom line of p. 188, this volume, instead of 499 and 139, read 0.499 and 0.139.

Page 403, line 15, read *dilates* for "contracts."

Page 412, last line, insert *the dilation* before "slowly."

Page 416, line 21, read *insensitive on touching* for "insensible to the touch."

Page 424, lines 24, 25, read *through the mouth to the posterior nares* instead of "through the posterior nares to the mouth."

Page 427, line 10, read *ball* for "belt."

Page 429, line 22, read *complete* for "relieved."

Page 433, lines 36, 37, read *five one-half-grain doses* for "five and a-half-grain doses."

Page 436, line 28, read *Dworak* for "Drvorak."

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